South Carolina

Department of Health and Environmental Control

Bureau of Air Quality

Updated Preliminary Determination

for

Santee Cooper (Pee Dee Generating Station)
Florence County, South Carolina

October 9, 2007
(Updated December 7, 2007)

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Santee Cooper (Pee Dee Generating Station)
Florence County, South Carolina

This review was performed by the Bureau of Air Quality of the South Carolina Department of Health and Environmental Control in accordance with South Carolina Regulations for the Prevention of Significant Air Quality Deterioration.

October 9, 2007
(Updated December 7, 2007)

Reviewed by:

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Time Line (Air Permitting Action History)

March 20, 2006	Santee Cooper's consultant submitted to South Carolina Department of Health and Environmental Control (DHEC), Class I Modeling Protocol for the proposed Pee Dee Generating Station.
April 11, 2006	Santee Cooper's consultant submitted to DHEC an addendum to Class I Modeling Protocol for the proposed Pee Dee Generating Station.
May 31, 2006	Santee Cooper submitted a Prevention of Significant Deterioration (PSD) construction permit application to the South Carolina Department of Health and Environmental Control (DHEC), Bureau of Air Quality (BAQ), proposing to add two (2) coal-fired boilers at the Pee Dee Generating Station located near Kingsburg, South Carolina. This application did not include all associated modeling analyses.
June 15, 2006	Santee Cooper, along with their consultant, and BAQ met to discuss permitting and modeling aspects of the application.
June 27, 2006	DHEC deemed the application incomplete by letter to Santee Cooper outlining the additional requested information to be submitted to DHEC. Status was also conveyed to the United States Environmental Protection Agency (EPA) Region 4 and Federal Land Manager.
July 13, 2006	Santee Cooper submitted Class II modeling protocol to DHEC.
July 25, 2006	Santee Cooper submitted Volume II of the application consisting of Class II Modeling Analysis. The facility also submitted a Class I Area Air Quality Modeling Report. The facility submitted these documents to the Federal Land Manager (as noted in letter received July 31, 2006, from Santee Cooper). The BAQ forwarded copies of these documents to EPA Region 4.
July 25, 2006	DHEC received by email additional information from Santee Cooper including boiler design, selective catalytic reduction (SCR) system, flue gas desulfurization (FGD) system, and electrostatic precipitator (ESP) system details.
July 26, 2006	Santee Cooper met with DHEC to discuss the application.

July 31, 2006	EPA Region 4 submitted initial comments and questions regarding the Santee Cooper Pee Dee PSD application.
August 1, 2006	Representatives of Santee Cooper, Trinity Consultants, EPA Region 4, and the BAQ met to discuss the application. Premises contained in the application were discussed as well as possible questions that may arise during the review process.
August 7, 2006	DHEC received a request from Santee Cooper to confirm what pre-construction activities (list included) could be undertaken prior to receiving a PSD construction permit.
September 22, 2006	DHEC provided Santee Cooper with a list of approved preconstruction activities.
September 28, 2006	DHEC received an application addendum from Santee Cooper consisting of a Part IIG form for Fuel Oil Tank #1.
October 17, 2006	Santee Cooper and Trinity Consultants met with DHEC to discuss project status and next steps.
October 26, 2006	DHEC received from Santee Cooper responses to EPA comments on the PSD application.
November 3, 2006	DHEC received from Santee Cooper additional information on mercury removal efficiency from coal fired boilers.
November 8, 2006	DHEC issued a letter to Santee Cooper (with copies to EPA, FLM and DHEC Region) indicating that the PSD permit application for Pee Dee is being deemed complete as of the July 25, 2006, receipt of the modeling analyses.
November 21, 2006	DHEC received from Santee Cooper responses to EPA and DHEC modeling comments on the PSD application.
December 4, 2006	DHEC received from Santee Cooper additional process schematic drawings of the coal, pet coke, limestone, fly ash, and gypsum material systems.
December 18, 2006	DHEC received from Santee Cooper a site plan general arrangement drawing.
December 20, 2006	DHEC received (by email) an updated listing of equipment and control devices.

December 27, 2006	Santee Cooper submitted responses on modeling comments to DHEC.
December 28, 2006	DHEC received more detailed information supporting the facility's selection of ESP (over fabric filter) as the particulate matter control technology.
January 2, 2007	DHEC submitted additional comments and questions on modeling in response to Santee Cooper's earlier comments to modeling issues.
January 29, 2007	DHEC received from Santee Cooper an application addendum on co-benefit mercury reductions, design fuel impact on BACT, and project revision to delete the auxiliary boiler from the application.
January 30, 2007	DHEC received from Santee Cooper's consultant revised modeling files for the proposed Pee Dee facility.
January 31, 2007	DHEC received from Santee Cooper additional modeling comments regarding modeling for the PSD application.
February 12, 2007	DHEC received from Santee Cooper updated project emission calculations, revised Part IIB forms, and additional Part IIB forms.
February 14, 2007	DHEC received additional information from Santee Cooper regarding BACT issues with sulfuric acid mist (H_2SO_4).
March 19, 2007	DHEC received from Southern Environmental Law Center Comments on Santee Cooper's PSD Application for Permit for the Pee Dee Facility.
March 21, 2007	Southern Environmental Law Center met with DHEC to discuss concerns with the Santee Cooper application, emphasizing the need to consider integrated gasification combined cycle (IGCC) as available technology for electric generation derived from use of coal.
March 30, 2007	Santee Cooper met with DHEC to discuss proposed revisions to modeling and emission rates and limits, and to discuss project status, future events, and timeline.
April 18, 2007	DHEC received from Santee Cooper supplemental information regarding technical evaluation of the integrated gasification combined cycle (IGCC) process including responses to Southern Environmental Law Center comments.
April 20, 2007	Santee Cooper submitted updated Class I modeling analyses along with an

	updated Class I protocol to address issues brought up by SC DHEC.
April 20, 2007	Santee Cooper and members of Van Ness Feldman law firm met with DHEC to discuss and provide additional information in support of supercritical coal technology rather than integrated gasification combined cycle (IGCC) process for the Pee Dee site.
May 4, 2007	DHEC received from Santee Cooper a revised listing of insignificant activities.
May 11, 2007	Santee Cooper submitted revised Part II application forms to DHEC.
May 21, 2007	Santee Cooper conducted a two-hour public information forum at the Hannah-Pamplico Middle School which is located near the proposed site to inform the public about the permit application. DHEC was in attendance to also answer questions.
May 29, 2007	Santee Cooper submitted a revised Volume II of II (Class II modeling analysis) to DHEC.
May 31, 2007	Santee Cooper met with DHEC to discuss status of permitting and modeling activities and review issues associated with the application.
May 31, 2007	DHEC received from Southern Environmental Law Center and other environmental advocacy groups a request to delay issuance of the draft permit until completion of an Environmental Impact Statement (EIS).
June 18, 2007	DHEC received from Santee Cooper a letter responding to the May 31, 2007 SELC letter and requesting the draft permit not be delayed until completion of the EIS.
June 29, 2007	DHEC received a follow-up letter from Southern Environmental Law Center in response to the June 18, 2007 letter from Santee Cooper commenting on differences of opinion and reiterating the request to delay issuance of the draft permit until completion of the EIS.
July 12, 2007	DHEC conducted a Question and Answer public meeting at the Hannah-Pamplico High School located adjacent to the Middle School. Santee Cooper was also present to assist in answering questions from the public.
July 26, 2007	Santee Cooper met with DHEC to discuss status of the project including both modeling and permitting aspects.
August 17, 2007	Santee Cooper submitted a second revision of Volume II of II (Class II

modeling analysis) to DHEC.

September 10, 2007 DHEC received from Southern Environmental Law Center a report providing comments and additional analysis in response to data submitted earlier by Santee Cooper comparing integrated gasification combined cycle (IGCC) to supercritical pulverized coal (SCPC).

September 13, 2007 DHEC received from Southern Environmental Law Center and other advocacy groups a request, should a draft permit be issued, for an extended public comment period of at least 90 days and for at least four public hearings located in Columbia, Charleston, Myrtle Beach, and the community of the proposed site.

September 13, 2007 DHEC issued an update on the air permit and Environmental Impact Statement (EIS) stating that a draft permit would be issued prior to completion of the EIS by the U.S. Corps of Engineers.

September 17, 2007 DHEC received comments from the US Department of Interior - Forest and Wildlife Service, Charleston, SC, office requesting the draft permit be delayed until completion of the EIS study.

September 27, 2007 DHEC received from Santee Cooper an application addendum containing additional information on sulfur content of design fuel, sulfuric acid mist requirements, cooling tower efficiency, nitrogen oxides BACT limit, and particulate matter continuous emissions monitoring system.

October 9, 2007 DHEC placed the PSD Preliminary Determination and Draft PSD Construction Permit No. 1040-0113-CA on public notice for a 60-day comment period by publication in the *Florence Morning News*, *The Sun News*, and *The State* newspapers. A public hearing was also scheduled at this time to receive oral and written comments on the proposed plant and draft permit. The public hearing was scheduled for Thursday, November 8, 2007, in the gymnasium of Hannah-Pamplico High School located at 2055 South Pamplico Highway in Pamplico, South Carolina. Interested persons who were in attendance at the July 12, 2007, public informational meeting, those who have submitted written comments concerning the proposed project; and/or those who have requested to receive updates or be added to the mailing list were notified of the public notice, public comment period and public hearing. All appropriate Federal and State Officials were notified as well.

October 12, 2007 DHEC received letter dated October 3, 2007, from the US Department of Interior - Fish and Wildlife Service, Denver, CO, office with comments on the PSD application and the Air Quality Analysis.

November 8, 2007	The public hearing was held in the gymnasium of the Hannah-Pamplico High School in Pamplico, South Carolina.
November 27, 2007	In discussions with EPA, DHEC realized that the draft permit that was placed on public notice and made available for public comment contained incorrect mass emission limits (tons per day). The mass emission limits are more stringent and lower in the correct version of the draft permit.
November 29, 2007	DHEC received a request from SELC to extend the public comment period due to difficulties accessing portions of information related to the permit application and review.
December 4, 2007	DHEC received a request from the Sierra Club to extend the public comment period due to difficulties accessing portions of information related to the permit application and review.
December 7, 2007	DHEC issued a public comment period extension through close of business on January 22, 2008, for submittal of comments on the proposed plant. The original draft permit documents from October 9, 2007, were corrected to specify the correct mass emission limits for the boilers.
December 7, 2007	The original public comment period closes. However, all written comments will be accepted until completion of the extended comment period on January 22, 2008.
Jan., 2007 - Present	DHEC has received comments by letter, email, and web response from individuals and groups, most questioning whether and when a permit should be issued with some indicating support for the project. These comments will be addressed in the Final Determination.

Introduction and Preliminary Determination

On May 31, 2006, Santee Cooper submitted a Prevention of Significant Deterioration (PSD) construction permit application to the South Carolina Department of Health and Environmental Control (DHEC), Bureau of Air Quality (BAQ), to construct two (2) new supercritical coal-fired boilers, each rated at a maximum heat input rate of 5,700 million British thermal units per hour (BTU/hr), and other supporting equipment to be located at the greenfield site of Pee Dee Generating Station near Kingsburg, and having an address of 2651 South Old River Road, Pamplico, South Carolina. The two boilers will also be capable of firing up to 30% petcoke (as percent of total solid fuel weight by weight) as fuel, and burning either ultra low sulfur fuel oil (No. 2 fuel oil allowed if ultra low sulfur fuel oil is not commercially available) or natural gas during periods of startup and flame stabilization. These boilers will be equipped with Low Nitrogen Oxides (NO_x) Burners, two-level separated overfire air and Selective Catalytic Reduction (SCR) Controls for controlling NO_x emissions. They will also be equipped with Flue Gas Desulfurization (wet limestone scrubbing) for controlling Sulfur Dioxide (SO_2) and sulfuric acid (H_2SO_4) emissions, and Electrostatic Precipitators for controlling Particulate Matter (PM) emissions. Other equipment included in this project consists of a coal handling system (railcar shaker unloader, conveyors, storage pile, crusher tower, transfer tower, coal bunkers (6 silos and one central dust collector in each of the two sets), an ash handling system including two fly ash silos, two (2) emergency generators, a fire pump, several storage tanks (fuel oil, lube oil, ammonia, and other chemicals), a limestone handling system (material transport, truck unloading, storage pile, conveyors, crusher, and silos), and a gypsum handling system (dewatering, conveyors to drops, storage piles, and truck loading).

Volume 1 of the application submitted by the facility included a Best Available Control Technology (BACT) analysis indicating that PM, PM_{10}, $PM_{2.5}$, SO_2, NO_x, CO, VOC, Lead, Fluorides, and Sulfuric Acid Mist were subject to PSD review. Volume II of the application included the modeling analysis and was submitted on July 25, 2006. The application was deemed complete as of July 25, 2006. This application is being processed as a PSD application subject to BACT review, and there are no requests for PSD avoidance (synthetic minor limitations) for any pollutants.

This facility is deemed a major source as defined by SC DHEC Regulation 61-62.5, Standard No. 7 "Prevention of Significant Deterioration (PSD)," based on potential emissions from the requested processes exceeding the 100 tpy level for a listed PSD category (fossil fuel boilers totaling more than 250 million British thermal units per hour heat input) for several pollutants. Other pollutants that exceed the significant increase level as defined in Standard No. 7 are also subject to PSD review. Pollutants subject to PSD review include Particulate Matter less than 2.5 Microns in Diameter ($PM_{2.5}$), Particulate Matter less than 10 Microns in Diameter (PM_{10}), Particulate Matter (PM), Sulfur Dioxide (SO_2), Nitrogen Oxides (NO_x), Carbon Monoxide (CO), Volatile Organic Compounds (VOCs), lead (Pb), Fluorides, and Sulfuric Acid Mist. It should be noted that this application is submitted for review based on Standard No. 7 revision dated June 4, 2005, that incorporated the U.S. Environmental Protection Agency (EPA) rules currently in place for PSD review. Although this Standard No. 7 regulation has not yet been incorporated into the South

Carolina State Implementation Plan (SIP) by EPA as a replacement of the earlier regulation, it has been approved by the SC DHEC Board and the State Legislature and is considered state effective. A PSD review includes a Best Available Control Technology (BACT) Determination, an Ambient Air Impact Analysis, and a Class I Area Impact Analysis.

In addition to the PSD requirements, this facility must comply with the New Source Performance Standards (NSPS), Subpart A "General Provisions," Subpart Da "Standards Of Performance For Electric Utility Steam Generating Units For Which Construction Is Commenced After September 18, 1978" for the primary boilers, Subpart Y "Standards Of Performance For Coal Preparation Plants" for portions of the coal handling operations, and Subpart OOO "Standards Of Performance For Nonmetallic Mineral Processing Plants" for portions of the limestone and gypsum handling systems, as well as the limestone crusher. The facility must also comply with the Risk Management Program (Clean Air Act (CAA), Section 112(r)) for anhydrous ammonia storage tanks. In addition, the new boilers will be subject to Acid Rain requirements specified in Title 40 of the Code of Federal Regulations, Part 72 "Permits Regulation," Part 73 "Allowance System," Part 75 "Continuous Emission Monitoring," and Part 76 "Acid Rain Nitrogen Oxides Emission Reduction Program," NO_x Budget Program (Nitrogen Oxides (NO_x) Budget Trading Program), CAIR (Clean Air Interstate Rule), and CAMR (Clean Air Mercury Rule). Certain State Regulations also apply to the proposed project, including SC DHEC Regulation 61-62.5, Standard No. 1 "Emissions from Fuel Burning Operations," Standard No. 2 "Ambient Air Quality Standards," Standard No. 4 "Emissions from Process Industries," Standard No. 5.1 "Best Available Control Technology (BACT)/Lowest Achievable Emission Rate ("LAER") Applicable to Volatile Organic Compounds," Standard No. 5.2 "Control of Oxides of Nitrogen (NO_x)," and Standard No. 7 "Prevention of Significant Deterioration." In addition, fugitive emissions will be subject to SC DHEC Regulation 61-62.6 "Control of Fugitive Particulate Matter."

On October 8, 2007, the BAQ made a preliminary determination that Boilers No. 1 and 2 and associated equipment may be constructed if the emission limitations and conditions outlined in Draft PSD/NSPS/NESHAP Construction Permit No. 1040-0113-CA are met. This draft permit is included as Appendix D of this Preliminary Determination. The Statement of Basis that contains explanations of the permitting actions is included as Appendix E of this Preliminary Determination.

The facility has submitted an application to install two boilers, each rated at 5,700 million BTU/hr heat input and 660 megawatts (MW) output, at the Pee Dee site with the understanding that Unit 1 installation would precede Unit 2 installation. That understanding is based on the Board of Directors for Santee Cooper having approved funds for only one of the two boilers at this time. Depending on if and when the Santee Cooper Board of Directors approves funds for the second boiler and/or the resulting installation schedule, the Bureau may request the facility to revisit the BACT analyses if it is not constructed within a reasonable timeframe.

Potential controlled emissions of pollutants subject to PSD review for the two new boilers are shown in Table 1, based on operating 8,760 hours/year each. Emissions from the emergency generators and fire pump are shown in Tables 2 and 3, shown on a potential controlled basis reflecting the restricted hours of operation of 500 hours per year. Emissions from the material handling processes are shown in Table 4. Project emissions are summarized in Table 5 for those pollutants that have PSD significance levels, showing the pollutants that are subject to PSD review. Discussions with Santee Cooper indicate the facility supports the use of EPA AP-42 emissions factors, where not otherwise indicated, and accepts any limits established on that basis.

While $PM_{2.5}$ (particulate matter with particle size less than or equal to 2.5 microns) emissions are listed in these tables, there is no separate BACT review in this document since EPA authorizes the use of PM_{10} as a surrogate for meeting $PM_{2.5}$ requirements under the PSD program. Specifically, EPA guidance authorizes permitting authorities to use PM_{10} as a surrogate for $PM_{2.5}$ until EPA promulgates $PM_{2.5}$ major NSR regulations. This guidance is contained in an October 23, 1997, memorandum (*Interim Implementation of New Source Review for* $PM_{2.5}$) from John S. Seitz, Director, Office of Air Quality Planning and Standards, to Regional Air Directors authorizing the use of PM_{10} as a surrogate for $PM_{2.5}$. An April 5, 2005, subsequent memorandum (*Implementation of New Source Review Requirements in* $PM_{2.5}$ *Nonattainment Areas*) from Stephen D. Page to Regional Air Directors reaffirmed the use of PM_{10} as a surrogate for $PM_{2.5}$. On April 25, 2007, EPA issued a rule known as Clean Air Fine Particle Implementation Rule defining requirements for State Implementation plans in areas of $PM_{2.5}$ nonattainment. However, $PM_{2.5}$ NSR requirements were not included in that rule but will instead be addressed in future rulemaking.

TABLE 1
POLLUTANT EMISSION RATES FOR BOILERS IN TONS/YEAR (TPY)

Pollutant	Emission Factor	Lb/hr (each)	TPY (one unit)	TPY (two units)
PM	0.018 lb/10^6 Btu	102.6	449	898
PM_{10}	0.018 lb/10^6 Btu	102.6	449	898
$PM_{2.5}$	0.018 lb/10^6 Btu	102.6	449	898
SO_2	0.12 lb/10^6 Btu *	684	2996	5992
NO_x	0.07 lb/10^6 Btu **	399	1748	3495
CO	0.15 lb/10^6 Btu	855	3745	7490
VOC	0.0024 lb/10^6 Btu ***	13.7	60	120
Lead	1.91 x 10^{-5} lb/10^6 Btu ***	0.109	0.48	0.96
Fluorides	3.41 x 10-4 lb/10^6 Btu	1.94	8.51	17.0
H_2SO_4 Mist	0.005 lb/10^6 Btu	28.5	125	250

* 24-hour average
** 30-day average
*** equivalent to 0.06 lb/ton for VOC, 4.2E-4 lb/ton for lead (AP-42 Tables 1.3, 13-15, 18-19) [uses 11,000 btu/lb for conversion].

TABLE 2 POLLUTANT EMISSION RATES FOR EMERGENCY GENERATORS				
Pollutant	**Emission Factor**	**Lb/hr**	**TPY (one unit)****	**TPY (two units)****
PM/PM_{10}	0.1 lb/million Btu*	1.41	0.36	0.72
SO_2	0.0505 lb/million Btu*	0.71	0.18	0.36
NO_x	3.2 lb/million Btu*	45.06	11.26	22.52
CO	0.85 lb/million Btu*	11.97	3.00	6.00
VOC	0.09 lb/million Btu*	1.27	0.32	0.64

* AP-42 Table 3.4-1
** Annual emissions are based on maximum operation of 500 hours.

TABLE 3 POLLUTANT EMISSION RATES FOR FIRE PUMP			
Pollutant	**Emission Factor**	**Lb/hr**	**TPY ****
PM/PM_{10}	0.31 lb/million Btu*	0.99	0.24
SO_2	0.29 lb/million Btu*	0.93	0.24
NO_x	4.41 lb/million Btu*	14.11	3.52
CO	0.95 lb/million Btu*	3.04	0.76
VOC	0.36 lb/million Btu*	1.15	0.28

* AP-42 Tables 3.3-1
** Annual emissions are based on maximum operation of 500 hours.

TABLE 4 POLLUTANT EMISSION RATES FOR MATERIAL HANDLING and COOLING TOWERS			
Pollutant	**Emission Factor**	**Lb/hr**	**TPY**
PM – coal	1.16E-03 lb/ton, 99% reduction if controlled (each transfer point)* 1.7E-06 lb/hr/sq ft (storage pile)**	6.57	12.96
PM – petcoke	1.16E-03 lb/ton, 99% reduction if controlled (each transfer point)* 1.7E-06 lb/hr/sq ft (storage pile)**	2.51	4.12
PM – coal/petcoke crusher	0.039 lb/ton and 99% reduction***	0.59	0.89
PM – limestone	1.06E-03 lb/ton, 99% reduction if controlled (each transfer point)* 1.2E-06 lb/hr/sq ft (storage pile)**	0.836	2.043

PM – limestone crusher	0.039 lb/ton and 99% reduction***	0.05	0.09
PM – gypsum	1.06E-03 lb/ton (each transfer point)* 1.4E-05 lb/hr/sq ft (storage piles)**	1.302	3.655
PM – fly ash	3.60E-03 lb/ton, 99% reduction if controlled (each transfer point, fly ash)* 9.50E-03 lb/ton and 99% control (transfer point, lime silo)*	0.0446	0.0230
PM – bottom ash	Material is in wet state and result is no emissions	0	0
PM – cooling towers	1.62E-05 lb/gal/min****	9.32	40.84
PM - Total		21.22	64.62
PM_{10} – coal	5.74E-04 lb/ton, 99% reduction if controlled (each transfer point)* 1.7E-06 x 0.6 lb/hr/sq ft (storage pile)**	3.25	6.7
PM_{10} – petcoke	5.47E-04 lb/ton, 99% reduction if controlled (each transfer point)* 1.7E-06 x 0.6 lb/hr/sq ft (storage pile)**	1.278	2.364
PM_{10} – coal/petcoke crusher	0.015 lb/ton and 99% reduction***	0.23	0.34
PM_{10} – limestone	5.00E-04 lb/ton, 99% reduction if controlled (each transfer point)* 1.2E-06 x 0.6 lb/hr/sq ft (storage pile)**	0.411	1.074
PM_{10} – limestone crusher	0.015 lb/ton and 99% reduction***	0.02	0.04
PM_{10} – gypsum	5.00E-04 lb/ton (each transfer point)* 1.4E-05 x 0.6 lb/hr/sq ft (storage piles)**	0.68	2.043
PM_{10} – fly ash	1.70E-03 lb/ton, 99% reduction if controlled (each transfer point, fly ash)* 4.49E-03 lb/ton and 99% control (transfer point, lime silo)*	0.0211	0.0109
PM_{10} – bottom ash	Material is in wet state and result is no emissions	0	0
PM_{10} – cooling towers	1.62E-05 lb/gal/min****	9.32	40.84
PM_{10} - Total		15.21	53.41

* AP-42 Section 13.2.4, Equation (1)
** EPA – 450/3-88-008
***AP 42 Table 11.19.2-2
****EPA Technical Report 600 7-79-215A

TABLE 5 PROPOSED PROJECT EMISSION RATES (TPY)			
Pollutant	**Combined Sources**	**Significance Level**	**Significant Increase?**
PM	964	25	Yes
PM_{10}	953	15	Yes
SO_2	5992	40	Yes
NO_x	3521	40	Yes
CO	7497	100	Yes
VOC	121	40	Yes
Lead	0.96	0.6	Yes
Fluorides	17	3.0	Yes
Sulfuric Acid Mist	250	7.0	Yes

Best Available Control Technology (BACT) Determination

SC DHEC Regulation 61-62.5, Standard No. 7, Section (j)(2) states that "A new major stationary source shall apply Best Available Control Technology for each pollutant subject to regulation under the Federal Clean Air Act that it would have the potential to emit in significant amounts." Table 6 compares the potential yearly emissions from the proposed facility with the significant emission rates listed in SC DHEC Regulation 61-62.5, Standard No. 7, Section (b)(49)(i). The following pollutants therefore require a BACT Determination: PM, PM_{10}, SO_2, NO_x, CO, VOC, lead, fluorides, and sulfuric acid mist.

BACT is described in Chapter B of *The New Source Review Manual* as a five-step process:

Step 1 Identify All Control Technologies;
Step 2 Eliminate Technically Infeasible Options;
Step 3 Rank Remaining Control Technologies By Control Effectiveness;
Step 4 Evaluate Most Effective Controls And Document Results; and
Step 5 Select BACT.

This review is required for each new or modified emission unit and pollutant emitting activity at which a net emissions increase occurs. BACT means an emission limitation, established on a case-by-case basis by the Department, that achieves the maximum degree of pollutant reductions of PSD regulated pollutants when energy, environmental, and economic impacts are taken into account. It should be noted in this application, Santee Cooper has not provided cost evaluations for those BACT selections resulting in the most effective control alternative. A cost evaluation is needed only when a less effective control alternative is compared to a more effective alternative. Although a BACT analysis is not required for opacity, BACT can include the use of visible emission limitations or work practice standards for regulated PSD pollutants; however, opacity is not considered to be a PSD pollutant and therefore opacity itself does not require a BACT evaluation and establishment of a BACT limit. Opacity limits have been included in the draft permit as required by State and Federal regulations. BACT cannot be less stringent than an applicable New Source Performance Standard (NSPS) or National Emission Standard for Hazardous Air Pollutants (NESHAP) as outlined in 40 CFR 60, 40 CFR 61, or 40 CFR 63. This electrical generating facility will contain emission units that will be subject to 40CFR60 Subpart Da, 40CFR60 Subpart Y, 40CFR60 Subpart OOO, 40CFR72, 73, 75, and 76.

The primary resource for establishing BACT is the RACT/BACT/LAER Clearinghouse (RBLC) database on the Technology Transfer Network (TTN) maintained by the United States Environmental Protection Agency (EPA). A user may query this database to extract a subset of the available information. BAQ personnel queried the RBLC database on June 21, 2006, for process code 11.110 (Utility- and Large Industrial-Size Boilers/Furnaces (more than 250 million Btu/hr). This query was compared with the application query to identify BACT sources. There are also additional sources of information that can be accessed. EPA also maintains a database of coal-fired utility sources that have undergone PSD and other federal regulatory reviews including some sources that may not be included in the RBLC database. This database was also reviewed for any BACT limits for comparable sources. Recently permitted coal fired units with updated BACT limits different from the database query have also been considered. Source test results of existing sources may also be reviewed to determine BACT. Other possible sources, such as special permitting and international facilities, may be investigated where revealed through discussions or passed-along information.

Best Available Control Technology for the Boilers

Boilers No. 1 and No. 2

The main source of emissions for this project will be the two (2) supercritical pulverized coal-fired boilers rated at 5,700 million Btu/hr maximum heat input and 660 MW output each. These boilers will have capability of firing coal and up to 30% petroleum coke (or petcoke). These boilers will also fire ultra low sulfur fuel oil (No. 2 fuel oil allowed if ultra low sulfur fuel oil is not commercially available) or natural gas during startup and flame stabilization up to a rate of 1,656 million Btu/hr.

The application included an overview of the boiler process with additional details described in a supplemental document submitted by email and received on July 25, 2006. Each boiler will be a sliding pressure supercritical, once-through design, equipped with emission control technologies including wet flue gas desulfurization for SO_2 control, selective catalytic reduction for NO_x control, and electrostatic precipitator for PM control. The boilers will be designed for single reheat, variable pressure operation, with balanced draft furnace conditions. These boilers will be designed to burn eastern U.S. coals. More details on the firing system, air and flue gas draft systems, pulverizers, air preheater, selective catalytic reduction, flue gas desulfurization, and electrostatic precipitator can be found in the referenced document. Additional details of the boiler system material flows can be found in a supplemental information document entitled "Boiler Process Description."

The facility also submitted additional information in the form of process schematics and site plan that further describe the proposed facility. This information was received December 4, 2006, and provides air flow rates as well as equipment configurations and arrangements.

The primary fuels for these boilers will be coal and petcoke. The coal will be an eastern bituminous coal with sulfur content ranging from 1.0% to 3.1% and the petcoke will have a sulfur content ranging from 3.4% to 7.0%. Ash content for the coal will range from 4.5% to 17% and for petcoke will range from 0.3% to 1.4%. Heat content for the coal will range from 11,000 Btu/lb to 13,000 Btu/lb and for petcoke will range from 13,600 Btu/lb to 14,700 Btu/lb.

The facility considered using coal other than the proposed eastern bituminous containing higher levels of sulfur. Powder River Basis coal mined in the western part of the United States is in ample supply; however, the rail system that delivers coal in the area of the proposed facility does not directly accept deliveries of western coals. Use of this coal would require a transfer between rail systems. The lower heating value of this coal would also result in using larger quantities of coal. The transfer logistics, longer and more expensive delivery, and greater risk of supply disruptions from involvement of multiple rails systems all make use of this coal economically unattractive. There are also limited quantities of lower sulfur eastern bituminous coals that were considered. However, because this type coal is in high demand, is more expensive to purchase, and is becoming increasingly difficult to obtain, use of this coal would not be practical over the life of the proposed project. For these reasons, the facility is proposing use of eastern bituminous coal as previously described.

Two other available alternative boiler processes were not included in the BACT analysis, but were reviewed and considered in the application review. One technology in use for some applications is circulating fluidized bed combustion. This technology uses lower heat content coal and is usually located close to the coal source. Since there is no coal mining source near the Pee Dee site, this technology was not included as a possible BACT technology in this review. Another technology that has emerged over the last few years is Integrated Gasification Combined Cycle (IGCC). This technology is not widely used as yet in the power generation sector and has not demonstrated competitive on-line efficiency and cost effectiveness. There are several reasons that the Bureau is not requiring the facility to consider the IGCC process as a viable BACT candidate at this time. While several new IGCC projects are being considered and proposed in the near future, there are only four IGCC units in operation that produce electricity, two in the U. S. and two overseas. These units have not consistently demonstrated the level of operability needed for a base load operation such as planned for the Pee Dee facility. The current prevalent regulatory position considers the use of IGCC technology as fundamentally redefining the process for an application that specifies the use of coal-fired boiler technology. Even if the above circumstances are discarded, the only experience to-date with IGCC is smaller sized units that would require installation of a greater number of units, increasing both space and investment cost. In addition, while BACT limits for IGCC operations for other sources have been proposed, there are no proven BACT limits for a base load operation like the proposed Pee Dee facility for which a favorable cost analysis has been demonstrated. While it is not disputed that an IGCC process may lead to lower levels of emissions as compared to a supercritical pulverized coal combustion process, there are still unresolved questions on how the two processes compare in any specific application. For this application, the Bureau does not believe that IGCC is a valid candidate for BACT consideration. More extensive views regarding the advantages and disadvantages of IGCC can be found in supplemental documents. A cover letter and document submitted by Santee Cooper entitled "IGCC Supplemental Information Cover Letter" and "IGCC Supplemental Information" describes their findings proposing that IGCC is outside the BACT determination process and includes some cost information. A document entitled "SELC et al Comments on Pee Dee Application" submitted by the Southern Environmental Law Center containing several files describes an opinion that IGCC should be considered within the BACT determination process.

PM/PM_{10} BACT Determination

Available Control Technology
Fabric Filters (FF)
Electrostatic Precipitators (ESP).

Technical Feasibility of Options
Both fabric filters and electrostatic precipitators are considered feasible for PM control, and each control device achieves essentially the same level of control. An ESP has the ability to handle large gas streams and high particulate loading with fewer complications, i.e., broader temperature and pressure ranges can be utilized on both wet and dry streams.

The application included a discussion of test methods and components of PM and PM_{10}. Conventionally, PM emissions are measured using Method 5 that measures only filterable emissions, not condensable emissions. In order to establish limits for both PM and PM_{10}, based on total emissions, PM emissions must use Method 5, 5B, or 17 for filterable and Method 202 for condensable. PM_{10} must use Method 201 for filterable and Method 202 for condensable.

The facility determined that ESP controls would be proposed for the Pee Dee site. The information provided by the facility indicated that almost all power plants burning eastern bituminous coal are equipped with ESP controls. Electrostatic precipitators have proven to perform better than fabric filters when burning eastern bituminous coal and using SCR controls because of the corrosive gases. The ESP for each boiler consists of hammer rapped rigid electrode fields in high voltage transformer-rectifier sets. Each row of collecting curtains in each field is rapped by one hammer assembly. Controls prevent more than one field being rapped at a given time. Additional details submitted by Santee Cooper discussing the advantages of ESP over fabric filters can be found in a supplemental information file entitled "Selection of Particulate Matter Control Technology". A more extensive description of the ESP proposed for use at the Pee Dee facility submitted by Santee Cooper can be found in a supplemental information document entitled "Electrostatic Precipitator Process Description."

The following sources with BACT limits for PM and/or PM_{10} emissions are shown as a basis for determination of a BACT limit for this source.

TABLE 6
PM/PM_{10} BACT LIMITS FOR SIMILAR SOURCES

Facility	Pollutant	Limit (Lb/million Btu)
Plum Point (AR)	PM/PM_{10}	0.018 (unknown avg period)
Palatka (FL)	PM/PM_{10} (filterable)	0.013 (3-hr avg)
Longleaf (GA)	PM/PM_{10} (filterable) PM/PM_{10} (total)	0.012 (3-hr avg) 0.030 (3-hr avg)
Prairie State (IL)	PM_{10}	0.018 (unknown avg period)
Sand Sage (KS)	PM_{10}	0.018 (6-hr avg)
Thoroughbred (KY)	PM	0.018 (3-hr avg)
Trimble (KY)	PM/PM_{10} (total) PM/PM_{10} (filterable)	0.018 (3-hr avg) 0.015 (3-hr avg)
Big Cajun (LA)	PM/PM_{10}	0.018 (unknown avg period)
Weston Bend (MO)	PM_{10}	0.018 (3-hr avg)
Bull Mountain (MT)	PM_{10} (filterable)	0.015 (source test, consider lowering to 0.012 after 18 months)
Montana Dakota (ND)	PM_{10} (filterable)	0.013 (3-hr avg)
Montana Dakota (ND)	PM_{10} (total) PM (filterable)	0.0167 (3-hr avg) 0.0167 (3-hr avg)
Municipal (NE)	PM_{10}	0.018 (3-hr avg)
Omaha Public (NE)	PM_{10} (total)	0.018 (30-day avg)
Mustang (NM)	PM/PM_{10}	0.018 (unknown avg period)
Newmont Mining (NV)	PM/PM_{10}	0.012 (24-hr avg)
Cross (SC)	PM (filterable)	0.015 (3-hr avg)
Cross (SC)	PM_{10} (total)	0.018 (3-hr avg)
Elm Road (WI)	PM/PM_{10}	0.018 (3-hr avg)
Longview Power (WV)	PM	0.018 (6-hr avg)
Black Hills (WY)	PM/PM_{10} (filterable)	0.012 (source test)

The facility is recommending that a BACT limit of 0.018 lb/million Btu be established for both PM and PM_{10}. The facility is also proposing that the averaging period be 6 hours due to variations in condensable emissions. The Bureau accepts the limit of 0.018 lb/million Btu for both PM and PM_{10} only if condensables are included. If the PM test method excludes condensables, then a limit of 0.015 lb/10^6 Btu shall be established for PM as similar to another recent permit for the Cross Generating Station. The Bureau also establishes the filterable only PM_{10} BACT limit at 0.012 lb/million Btu, consistent with specified limits for several other facilities at that level. Also, an averaging period of 3 hours has been predominantly specified in most decisions and the Bureau establishes a 3-hour averaging period as representative of BACT requirements. As additional support for the 3-hour averaging period, condensable emissions are a much smaller portion of the total emissions than the filterable portion so variations in condensable emissions should not excessively impact the average.

In addition to the BACT limits discussed above, a distinction should be pointed out that the PM limit specified by the NSPS Subpart Da regulation allows testing for filterable particulate only. Thus, the PM limit associated with Subpart Da will specify a limit of 0.015 lb/million Btu based on the difference in test method that does not include condensable particulate matter.

Conclusion of BACT for PM/PM_{10}
The BACT emission limits for total PM and total PM_{10} for Boilers No. 1 and 2 is established to be 0.018 pounds per million Btu (3-hour averaging period, and including condensable emissions). A BACT limit for PM filterable only is determined to be 0.015 pounds per million Btu (3-hour averaging period) and a BACT limit for PM_{10} filterable only is determined to be 0.012 pounds per million Btu (3-hour averaging period). These limits are consistent with BACT limits established in other recent projects. These BACT emission limits will be met by use of ESP controls.

SO_2 BACT Determination

Available Control Technology
Wet Flue Gas Desulfurization
Dry Flue Gas Desulfurization

Technical Feasibility of Options
Essentially all eastern US facilities have permits involving the use of wet flue gas desulfurization (FGD) which is generally considered as the most effective control method. The only exception is the Longleaf Energy facility in Georgia which recently received a PSD permit that is based on the use of dry flue gas desulfurization (DFGD). Wet flue gas desulfurization (WFGD) can achieve percent reduction levels of 97.5% or greater. The FGD system is equipped with a limestone slurry feed system that supplies the appropriate amount of limestone to the absorber. Proper gypsum slurry density is maintained by bleeding slurry from the absorber system to the dewatering system. A more detailed description of the proposed FGD system as submitted by Santee Cooper can be found in a supplemental information document entitled “Flue Gas Desulfurization Process Description.”

The following sources with BACT limits for SO_2 emissions are shown as a basis for determination of a BACT limit for this source. These sources represent a variety of solid fuel types, such as eastern bituminous and western Powder River Basin coals, that contain different levels of sulfur content.

TABLE 7 SO_2 BACT LIMITS FOR SIMILAR SOURCES		
Facility	Pollutant	Limit (Lb/million Btu)
Plum Point (AR)	SO_2	0.16 (unknown avg period)
Palatka (FL)	SO_2	0.165 (24-hr avg, PSD avoidance)
Longleaf (GA)	SO_2	0.12 (24-hr avg) 0.065 – 0.105 (30-day avg, depending on uncontrolled emission rate)
Prairie State (IL)	SO_2	0.30 (unknown avg period)
Sand Sage (KS)	SO_2	0.15 (30-day avg)
Thoroughbred (KY)	SO_2	0.41 (24-hr avg) 0.167 (30-day avg)
Trimble (KY)	SO_2	8.94 tpd (~0.11 lb/million Btu) (PSD avoidance, 24-hr avg)
Big Cajun (LA)	SO_2	0.10 (unknown avg period)
Weston Bend (MO)	SO_2	0.12 (30-day avg)
Bull Mountain (MT)	SO_2	0.15 (1-hr avg) 0.12 (24-hr avg)
Municipal (NE)	SO_2	0.12 (30-day avg)
Omaha Public (NE)	SO_2	0.48 (3-hr avg) 0.163 (24-hr avg) 0.095 (30-day avg)
Mustang (NM)	SO_2	0.11 (unknown avg period)
Cross (SC)	SO_2	0.13 (Annual avg - PSD avoidance)
Elm Road (WI)	SO_2	0.15 (30-day avg)
Longview Power (WV)	SO_2	0.15 (unknown avg period)
Black Hills (WY)	SO_2	0.10 (30-day avg)
Newmont Mining (NV)	SO_2	0.09 (24-hr avg)

The applicant is recommending that a BACT limit of 0.14 lb/million Btu (revised from an initial recommendation of 0.15 lb/million Btu) be established for SO_2 based on a 24-hour block average and a BACT limit of 0.12 lb/million Btu be established for SO_2 based on a 30-day rolling average. While several facilities have recently been permitted at 0.15 lb/million Btu, there are more stringent limits of 0.12 lb/million Btu (24-hr basis) for Longview Power (WV), a limit of 8.94 tons/day (which is equivalent to a limit of 0.11 lb/million Btu, 24-hr basis, at nominal full load) established for Trimble (KY), and a limit of 0.12 lb/million Btu for Longleaf (GA) using DFGD. There are a few instances of limits established below the 0.12 lb/million Btu, but are believed to be based on use of low-sulfur western coal that cannot be compared directly with the higher-sulfur eastern coal proposed by Santee Cooper. While there are a few sources that have selected DFGD as the BACT control, it is generally concluded that WFGD provides better control of SO_2 emissions and is the predominant control device of choice.

The BACT limit proposed by the facility incorporates several factors including source of coal supply and use of petcoke. The facility commented that one of their current plants has traditionally used a coal source with lower sulfur content levels but notes that supplies of low sulfur coal are being depleted and future availability will be more limited. Santee Cooper is proposing to burn petcoke blended with coal up to 30% by weight. Even though petcoke has a higher sulfur content (up to 7% compared with up to 3.1% for coal), Santee Cooper states that the proposed BACT limit has been determined independent of use of petcoke. The Bureau does not believe it is necessary to restrict fuel to exclude petcoke in establishing the appropriate BACT limit but recognizes that the facility may find it necessary to restrict the level of petcoke use depending on presence of high sulfur content in both the coal and petcoke.

The facility initially proposed a combined daily limit between the two boilers of 15.05 tons, which is equivalent to 0.11 lb/million Btu at full operation. After submittal of revised modeling analyses using a rate of 0.12 lb/million Btu and review of BACT limits set for the three facilities stated above, the Bureau believes the facility has not provided sufficient arguments to warrant a BACT level higher than 0.12 lb/million Btu. The Bureau determines, therefore, that a BACT limit be set at 0.12 lb/million Btu using a 24-hour block averaging period.

Conclusion of BACT for SO_2
Santee Cooper states that Wet Flue Gas Desulfurization is the most effective control, and is proposing a BACT limit of 0.14 lb/million Btu. A review of recent BACT decisions supports WFGD as the prevalent control method. Although the facility is requesting a BACT limit of 0.14 lb/million Btu, a limit of 0.12 lb/million Btu is determined using a 30-day rolling average. This limit is based on other recent BACT decisions and ability to burn limited quantities of petcoke. This BACT limit includes startup and shutdown emissions associated with coal and petcoke combustion since the control equipment is operable while firing these fuels.

NO_x BACT Determination

Available Control Technology
Low NO_x Burners
Selective Catalytic Reduction
Selective Non-Catalytic Reduction
Staged Combustion
Overfire Air
Good Combustion Practices
Combination Low NO_x Burners and Selective Catalytic Reduction
Combination Low NO_x Burners, Overfire Air, and Selective Catalytic Reduction

Technical Feasibility of Options
All the available control technologies listed are feasible.

The application specifies that overfire air will be inherently designed into the boiler design. The addition of Low NO_x Burners and SCR controls in combination will provide the best level of control. The proposed SCR design for each boiler will include one SCR with two reactor chambers located between the economizer outlet and the air heater's inlet. An injection grid supplies a mixture of ammonia gas and air into the flue gas upstream of the catalyst. A more detailed description of the SCR system as submitted by Santee Cooper can be found in a supplemental information document entitled "Boiler Process Description." Since this is the proposed BACT technology, a cost analysis for choosing a less efficient technology is not necessary. With very few exceptions where circumstances warrant more stringent limits, recently permitted sources have limits established at 0.07 lb/million Btu.

The following sources with BACT limits for NO_x emissions are shown as a basis for determination of a BACT limit for this source.

TABLE 8
NO_x BACT LIMITS FOR SIMILAR SOURCES

Facility	Pollutant	Limit (Lbs/million Btu)
Plum Point (AR)	NO_x	0.09 (24-hr avg)
PSC Comanche (CO)	NO_x	0.08 (30-day avg)
Palatka (FL)	NO_x	0.07 (PSD avoidance)
Longleaf (GA)	NO_x	0.07 (30-day avg) 0.05 (12-month avg)
Mid American (IA)	NO_x	0.07 (30-day avg)
Prairie State (IL)	NO_x	0.07 (30-day avg)
Sand Sage (KS)	NO_x	0.15 (30-day avg - first 3 years) 0.08 (30-day avg - after 3 years)
Thoroughbred (KY)	NO_x	0.07 (30-day avg)
Trimble (KY)	NO_x	4.17 tpd (~0.05 lb/million Btu) (PSD avoidance, at full load)
Big Cajun (LA)	NO_x	0.071 (30-day avg)
Weston Bend (MO)	NO_x	0.08 (30-day avg)
City Utilities (MO)	NO_x	0.08 (30-day avg)
Bull Mountain (MT)	NO_x	0.1 (1-hr avg)0.07 (24-hr avg)
Omaha Public (NE)	NO_x	0.12 (30-day avg – first 18 months) 0.07 (30-day avg – after 18 months)
Municipal (NE)	NO_x	0.08 (30-day avg)
Desert Rock (NM)	NO_x	0.06 (24-hour avg)
Mustang (NM)	NO_x	0.09 (unknown avg)
Newmont Mining (NV)	NO_x	0.067 (24-hr avg)
Cross (SC)	NO_x	0.08 (annual avg – PSD avoidance)
CPS San Antonio (TX)	NO_x	0.069 (30-day avg)0.05 (annual avg)
Sandy Creek (TX)	NO_x	0.07 (30-day avg)0.05 (annual avg)
Black Hills (WY)	NO_x	0.07 (30-day avg)
Elm Road (WI)	NO_x	0.07 (30-day avg and annual avg)
Longview Power (WV)	NO_x	0.08 (24-hr avg) 0.07 (30-day avg) 0.065 (annual avg)

The Bureau is establishing a 30-day BACT limit of 0.07 lb/million Btu, consistent with the limit proposed by Santee Cooper. This limit is considered to be appropriate level based on the established BACT limits for other sources burning bituminous coal.

Conclusion of BACT for NO_x

The combination of Low NO_x Burners, Overfire Air, and Selective Catalytic Reduction provides the greatest level of NO_x control and is accepted as the means to achieve BACT emission levels of 0.07 lb/million Btu (30-day average). This averaging period has been the predominant averaging period for other recently permitted facilities. This BACT limit will exclude startup and shutdown emissions since the SCR cannot function effectively during those periods. The BACT determination is proposed to include provisions of a startup and shutdown plan describing how NO_x emissions will be reduced to the maximum extent possible during startups and shutdowns as well as defining what constitutes a startup and shutdown, from both a process and duration perspective.

MULTI-POLLUTANT CONTROL TECHNOLOGY

Santee Cooper stated that other technologies have been and are continuing to be considered, including ammonia scrubbers and sodium bisulfite controls but those systems are either not demonstrated and commercially available or do not achieve better control than the FGD and SCR controls proposed. The IGCC process can also be considered in this question, but has been excluded as discussed elsewhere in this document.

CO and VOC BACT Determination

Available Control Technology

Catalytic Oxidation

Good Combustion Practices

Technical Feasibility of Options

Catalytic oxidation is not feasible for coal-fired boilers due to rapid deterioration of the oxidation bed by hot, SO_2 laden gases. Cooling of the gases before encountering the catalyst is not practical because hot gases are required for the desired reaction. Therefore, good combustion practices is the only feasible option for consideration.

The following sources with BACT limits for CO and VOC emissions are shown as a basis for determination of BACT limits for this source.

TABLE 9
CO BACT LIMITS FOR SIMILAR SOURCES

Facility	Pollutant	Limit (Lb/million Btu)
Plum Point (AR)	CO	0.16 (unknown avg period)
Palatka (FL)	CO	0.13 (3-hr avg, coal only) 0.15 (30-day avg, all fuels)
Longleaf (GA)	CO	0.30 (1-hr avg) 0.15 (30-day avg)
Prairie State (IL)	CO	0.15 (unknown avg period)
Sand Sage (KS)	CO	0.15 (3-hr avg)
Thoroughbred (KY)	CO	0.1 (30-day avg)
Trimble (KY)	CO	0.5 (3-hr avg)

		0.10 (30-day avg)
Big Cajun (LA)	CO	0.135 (unknown avg period)
Weston Bend (MO)	CO	0.16 (3-hr avg)
City Utilities (MO)	CO	0.16 (3-hr avg)
Bull Mountain (MT)	CO	0.15 (source test)
Omaha Public (NE)	CO	0.16 (30-day avg)
Municipal (NE)	CO	0.15 (3-hr avg)
Mustang (NM)	CO	0.15 (unknown avg period)
Cross (SC)	CO	0.16 (3-hr avg)
Elm Road (WI)	CO	0.12 (unknown avg period)
Longview Power (WV)	CO	0.11 (unknown avg period)

TABLE 10
VOC BACT LIMITS FOR SIMILAR SOURCES

Facility	Pollutant	Limit
Plum Point (AR)	VOC	0.02 (unknown avg period)
Palatka (FL)	VOC	0.0034 (Method25A or 18)
Longleaf (GA)	VOC	0.0036 (3-hr avg)
Prairie State (IL)	VOC	0.01 (unknown avg period)
Sand Sage (KS)	VOC	0.0035 (3-hr avg)
Thoroughbred (KY)	VOC	0.0072 (30-day avg)
Trimble (KY)	VOC	0.0032 (3-hr avg)
Big Cajun (LA)	VOC	0.015 (unknown avg period)
Weston Bend (MO)	VOC	0.0036 (3-hr avg)
City Utilities (MO)	VOC	0.0036 (3-hr avg)
Bull Mountain (MT)	VOC	0.003 (unknown avg period)
Omaha Public (NE)	VOC	0.0034 (unknown avg period)
Mustang (NM)	VOC	0.01 (unknown avg period)
Cross (SC)	VOC	0.0024 (3-hr avg)
Elm Road (WI)	VOC	0.0035 (unknown avg period)

Conclusion of BACT for CO and VOC

Good combustion practices is deemed BACT for CO and VOC for Boilers No. 1 and 2. Good combustion practices would include optimum boiler operation maintaining adequate boiler temperature and excess oxygen availability for complete combustion. Based on a review of several RBLC entries for CO limit, a range exists from 0.10 lb/million Btu to 0.16 lb/million Btu, with most of the sources at either 0.15 lb/million Btu (8 sources) or 0.16 lb/million Btu (5 sources). The BAQ believes a CO limit of 0.15 lb/million Btu is representative of BACT and is determined as the BACT limit (30-day rolling average). For VOC, the RBLC database shows a range from 0.0024 lb/million Btu to 0.015 lb/million Btu for 13 different sources. The facility has proposed a VOC emission limit for Boilers No. 1 and 2 of 0.0024 lb/million BTU, each, and is the recommended limit.

Sulfuric Acid BACT Determination

Available Control Technology

Wet Flue Gas Desulfurization

Wet ESP
Dry Sorbent Injection

Technical Feasibility of Options

Generally, sulfuric acid is controlled in the same manner as SO_2; however, the application describes other recent permits (Thoroughbred, Prairie State, and Longview) as controlled by wet ESP or dry sorbent injection. The application does not describe feasibility of controls but does characterize emission limits. The proposed limit assumes there is more sulfuric acid generated by the SCR than is removed by the wet flue gas desulfurization (FGD). In arriving at a proposed BACT level in the initial application, the facility has taken the highest referenced emission rate (0.0075 lb/million Btu) which is 50% higher than the other two referenced rates (0.005 lb/million Btu and 0.00497 lb/million Btu) and suggests using an equivalent mass rate (0.0075 x 5700 = 42.75 lb/hr) as the BACT limit. The Bureau establishes a BACT limit consistent with the lower rates and sets the limit on a unit rate basis rather than a mass rate basis. The BACT limit will apply to each boiler, using a 3-hour averaging period. This limit equates to an emission rate of 28.5 lb/hr at maximum capacity for each boiler. In supplemental information submitted by Santee Cooper, the facility accepts the BACT limit at 0.005 lb/million Btu using wet FGD controls.

TABLE 11
H_2SO_4 BACT LIMITS FOR SIMILAR SOURCES

Facility	Pollutant	Limit (Lb/million Btu)
Plum Point (AR)	H_2SO_4	0.0061 lb/million Btu (unknown avg period)
Palatka (FL)	H_2SO_4	0.005 (Method 8A, PSD avoidance)
Longleaf (GA)	H_2SO_4	0.005 (3-hr avg)
Prairie State (IL)	H_2SO_4	0.039 lb/million Btu (unknown avg period)
Thoroughbred (KY)	H_2SO_4	0.00497 (30-day avg)
Trimble (KY)	H_2SO_4	26.6 lb/hr (3-hr avg)
Bull Mountain (MT)	H_2SO_4	0.0064 (source test)
Omaha Public (NE)	H_2SO_4	0.0042 (unknown avg period)
Elm Road (WI)	H_2SO_4	0.01 lb/million Btu (unknown avg period)
Longview Power (WV)	H_2SO_4	0.0075 lb/million Btu (unknown avg period)

Conclusion of BACT for Sulfuric Acid

A BACT limit of 0.005 lb/million Btu for each boiler (3-hour averaging period) is determined, achieved by use of wet flue gas desulfurization as control technology.

Fluorides BACT Determination

Available Control Technology

Wet Flue Gas Desulfurization

Technical Feasibility of Options

The application describes the control technology as being the same for SO_2. It is assumed that since the fluoride emissions are much smaller than the SO_2 emissions, proposing a different control technology for fluorides than for SO_2 would be impractical. Thus, BACT controls for fluorides will be the same as for SO_2, that is, the use of wet flue gas desulfurization.

The application assumes a conservative control efficiency of 95% for fluorides (compared to 97.5% or higher for SO_2) which equates to an emission rate of 3.41 x 10^{-4} lb/million Btu (0.15 lb/ton uncontrolled x 2000 lb/ton x 0.05 x 1 lb/11,000 Btu). The facility is also proposing an averaging period of 30 days (rolling average); however, since compliance with this limit will be determined based on a source test, a 3-hour averaging period is recommended.

TABLE 12 FLUORIDES BACT LIMITS FOR SIMILAR SOURCES		
Facility	Pollutant	Limit (Lb/million Btu)
Longleaf (GA)	HF	0.0024 (Powder River Basin coal) 0.0031 (Central Appalachian coal)
Thoroughbred (KY)	HF	0.000159 (30-day avg)
Municipal (NE)	HF	0.0004 (unknown avg period)
Omaha Public (NE)	HF	0.0004 (30-day avg)
Elm Road (WI)	HF	0.00088 (unknown avg period)

Conclusion of BACT for Fluorides
A BACT limit of 3.41 x 10^{-4} lb/million Btu is determined for fluorides, based on a 3-hr averaging period. The application states that upon testing, if it is determined that non-HF emissions are small enough that the PSD applicability threshold is not triggered, the facility may request to remove the BACT limit.

Lead BACT Determination

Available Control Technology
Fabric Filter (FF)
Electrostatic Precipitators (ESP)

Technical Feasibility of Options
Lead is typically controlled in the same manner as particulate matter and either fabric filter or electrostatic precipitator are effective for removal of lead emissions. Since the ESP is considered BACT for particulate matter emissions, the ESP is also considered BACT for control of lead emissions.

Conclusion of BACT for Lead
The BACT emission limit for lead from Boilers No. 1 and 2 is established at 1.91E-05 lb/million Btu for each boiler, consistent with controlled emissions rates using ESP when burning bituminous coal.

Control of Non-PSD-Regulated Pollutants
Other pollutants of concern and previously regulated by PSD rules include mercury, trace metals (including beryllium), and acid gases. These pollutants are no longer regulated by the revised PSD rules but the facility has suggested that the proposed use of ESP, FGD, and SCR will also serve to provide effective control for these pollutants.

Mercury
The facility submitted supplemental information received on January 29, 2007, describing co-benefit reduction of mercury emissions from a coal-fired boiler equipped with controls for other pollutants. This document (*Mercury Capture and Fate Using Wet FGD at Coal-fired Power Plants* by Charles E. Miller, Thomas J. Feeley, III, William W. Aljoe, Bruce W. Lani, Karl T. Schroeder, Candace Kairies, Andrea T McNemar, Andrew P. Jones, and James T. Murphy) describing the results of research and development efforts conducted by the National Energy Technology Laboratory of the US Department of Energy Office of Fossil Energy and the Science Applications International Corporation suggests that coal-fired boilers equipped with SCR/ESP/FGD controls could be expected to remove as much as 80% or more of mercury. A second report describing this same conclusion is stated in a technical presentation given at the Mercury Control Technology Conference in December, 2006, by Consol Energy. This report describes results of tests on ten boilers equipped with various combinations of controls, five of which are similar to the proposed Pee Dee units. These documents can be found in a supplemental information file entitled "Information on Mercury Removal."

Even though mercury is not a PSD regulated pollutant, the SCR/ESP/FGD combination of controls will provide co-benefit reduction of mercury emissions. The boilers will be subject to a mercury limit imposed by New Source Performance Standard (NSPS) Subpart Da of 0.020 lb/gigawatt hour that equates to 2.3×10^{-6} lb/million Btu and would result in approximately 115 pounds per year for each boiler at maximum operation. These boilers will also be subject to CAMR rules that limit total mercury emissions from all utilities. Under CAMR, individual facilities can meet allocated limits by additional controls or participation in an established trading program. The facility has agreed to reduce mercury emissions from the boilers by 90%. Additional requirements included in the CAMR rule as adopted by South Carolina call for studies to determine if there are "hot spots" for mercury deposition and whether additional controls are needed to alleviate those. If those studies show hot spots in the surrounding area of this proposed facility, the facility will be required to evaluate the feasibility of installing additional controls.

Based on the agreed control level of 90%, the Bureau is establishing a requirement that mercury emissions be limited to 69 pounds per year per unit. This emission rate is based on 90 % control of mercury content in coal, allowing one standard deviation above the average, based on bituminous coal described in the EPA document "ICR Data Analysis Presentation for NWF" (September, 2000), and is further supported by recent source tests from the new Boiler No. 3 at the Santee Cooper Cross Generating Station. The ICR data shows an average mercury content in bituminous coal of 7.05 lb/trillion Btu and standard deviation of 6.69 lb/trillion Btu. [(7.05 + 6.69) lb/trillion Btu x 5700 million Btu/hr x 8760 hr/yr x 10% = 69 lb/yr.] For comparison purposes, the recently issued PSD permit for Santee Cooper Cross Units 3 and 4 established BACT limits for mercury of 3.6×10^{-6} lb/million Btu. The NSPS limits for the Pee Dee facility are 37% lower than the Cross limits; however, the 90% control level will be more stringent than the NSPS limit.

Santee Cooper will design the plant layout to accommodate possible future additional mercury controls if those are deemed necessary upon further study.

Trace Metals and Acid Gases

Most non-PSD regulated trace metals (antimony, arsenic, beryllium, cadmium, chromium, cobalt, and manganese) are readily controlled in the same manner as particulate matter. The ESP controls will provide substantial reductions in emissions of these pollutants.

The primary non-PSD-regulated acid gas is hydrochloric acid. Similar to hydrofluoric acid, this pollutant is water soluble and will be significantly controlled by the FGD system.

Carbon Dioxide

The predominant greenhouse gas emitted by this proposed facility is carbon dioxide. Based on EPA AP-42 emission factors, estimated emissions of this pollutant may be 5.8 million tons/year at full operation per boiler. Carbon dioxide is not currently listed as an NSR regulated pollutant in the PSD regulations. Current regulations do not place any limits on this pollutant nor require any controls for capturing or reducing a portion of these emissions. There are proposals under review and discussion in various governmental bodies that may result in future regulations that limit emissions of this pollutant. If those future regulations require a reduction of greenhouse gas emissions, this facility will be required to comply with those regulations to the extent they apply to the proposed units based on how they will be categorized at the effective time.

Best Available Control Technology for Other Sources

Specifically, the other sources include two (2) emergency generators, a fire pump, material handling operations, and cooling towers.

Since the emergency generators and fire pump will operate only on an emergency and periodic basis, the use of ultra low sulfur fuel is considered adequate application of BACT technologies. In addition, good combustion practices shall be followed by maintaining these units in proper operating condition. These sources will be limited to use of 0.0015 ultra low sulfur oil (0.05% sulfur oil if ultra low sulfur oil is not commercially available) as fuel.

Material handling operations – sources whose emissions are controlled by fabric filters or bin vents shall achieve control efficiencies as specified in the application – 99% for fabric filters except 99.5% for coal bunker fabric filters; 95% for fly ash silo truck vacuum systems; and 50% for fugitive emissions controlled by wet suppression. Other fugitive emissions may remain uncontrolled. Emission limits for material handling equipment will specify unit rates based on the above control levels. Initial source testing will consist of representative sources in order to avoid duplicative testing. Additional details of the coal and petcoke handling systems, fly ash handling system, gypsum handling system, and limestone handling system can be found in a supplemental information file entitled “Material Handling Process Descriptions.”

Cooling towers – the cooling towers will be equipped with high efficiency drift eliminators which will maintain particulate emissions at or below a level of 0.0005% of the flow. In regard to questions on use of a dry cooling system, Santee Cooper responded that dry cooling systems will not function effectively in humid environments as is the case for the Pee Dee site.

Other Related Permitting Factors

BACT for Main Boilers during Startup and Shutdown

The Bureau establishes the following set of enforceable permit requirements to minimize emissions during periods of startup and shutdown of the main boilers. These requirements will apply in lieu of the BACT limits that would apply during periods of normal operation (i.e., other than startup and shutdown).

First, Santee Cooper shall use ultra low sulfur distillate oil (containing 0.0015% or less sulfur) or natural gas for the initial startup of the main boilers. In the event that ultra low sulfur distillate oil is not commercially available, the facility shall be allowed to use low sulfur distillate oil containing 0.05% or less sulfur. The pollution control systems shall be brought into service during startup, consistent with the technical limitations, manufacturers’ specifications, and good engineering and maintenance practices. The ESP and FGD systems shall achieve substantial control upon introduction of coal into the boilers, and optimum performance upon the unit reaching steady load conditions. The SCR system shall be brought into service upon the unit reaching minimum load levels that correspond to specific flue gas temperatures necessary for operating the SCR system, as specified by the manufacturer. The startup period shall end once the SCR system is brought into service. No specific operating procedures will apply during periods of shutdown since emissions are not expected to fluctuate significantly and will essentially cease upon elimination of fuel in the boilers.

Second, the main boilers shall comply with the mass emission limit that will be calculated in accordance with the following formula:

$L = A \times B \times C$, where

L = Limit during startup and shutdown period expressed in pounds,
A = Maximum allowable heat input for boiler expressed in million Btu/hr,
B = Applicable BACT limit, expressed in lb/million Btu,
C = Duration of startup and shutdown period expressed in hours.

This mass emission limit shall apply during all periods of startup and shutdown, unless DHEC determines that emissions in excess of the limit were unavoidable after demonstrating having met the following factors: (1) proper maintenance and operation of pollution control system and related process equipment; (2) measures taken to prevent occurrence of the excess emissions; and (3) efforts taken to minimize the extent and duration of the excess emissions.

Impact Analysis

Air quality impacts are typically quantified as concentrations of a pollutant per period of time. These concentrations are measured in micrograms of pollutant per cubic meter of air. Different pollutants have different allowable concentrations, and some pollutants have allowable concentrations for several different time periods. The National Ambient Air Quality Standards (NAAQS) establish allowable concentrations of pollutants for the ambient air. South Carolina adopted these standards, and they are listed in SC DHEC Regulation 61-62.5, Standard No. 2 "Ambient Air Quality Standards." Air dispersion modeling using EPA approved computer programs (either SCREEN, ISCST, CALPUFF, or AERMOD) is the preferred method for estimating concentrations from a proposed new or modified source of air pollutants. The mathematical air dispersion models, coded into these computer programs, estimate the concentrations (impacts) of air pollutants expected to occur at any given downwind location from the emission.

For a major facility, PSD regulations require an applicant to analyze the impact from the construction of a proposed new source(s) on the following areas:

1. Compliance with the National and State Ambient Air Quality Standards;
2. Compliance with the PSD Increments;
3. Significant impact on PSD Class I Areas, including Class I PSD increments;
4. Impairments to visibility, soil, and vegetation; and
5. Air Quality impact of general growth associated with the source.

All minor and major sources proposing new construction or construction modifications in South Carolina (SC) are also required to demonstrate that their facility will remain in compliance with South Carolina Regulation 61-62.5 Standards 2 (AAQS), 7 (Class II PSD Increments), and 8 (Air Toxics). General results of this compliance demonstration indicate that there will be no exceedances of Full Impact or South Carolina ambient air quality standards or PSD increments. Toxic emissions of sulfuric acid (H_2SO_4) were determined to be in compliance with Standard 8. Refined Class I modeling indicated that there will also be no adverse effects on visibility in any of the Class I areas within 200 km or on vegetation and soils.

Section A - PSD Significant Determination

The Santee Cooper Pee Dee facility will be a new source. Since this facility is listed in one of the 28 industrial categories defined in Standard 7, the PSD major source threshold is 100 TPY for any NSR pollutant. Each pollutant increase is compared to this PSD threshold value. If one pollutant exceeds the threshold value, the remaining pollutants are then compared to the significant levels to determine which other pollutants also require a PSD review. Pollutants not exceeding the PSD significance level will not require a PSD Review, however, they must demonstrate compliance with SC State Regulation 61-62.5, Standards 2, 7, and 8 and guidelines defined for minor sources constructing and operating air emission sources in South Carolina.

Table 13 lists the maximum potential emission rates for this project. Comparison of each pollutant to the respective PSD significance indicates that TSP, PM_{10}, SO_2, NO_x, CO, VOC/Ozone, Fluorides, Lead, and Sulfuric Acid Mist (H_2SO_4) will require a PSD Review to demonstrate compliance with Class II PSD increments (Standard 7) and Ambient Air Quality Standards (AAQS) (Standard 2).

TABLE 13
PREVENTION OF SIGNIFICANT DETERIORATION (PSD)
EMISSION RATES

POLLUTANT	POTENTIAL EMISSIONS (TONS/YR)	PSD SIGNIFICANT EMISSION RATE (TONS/YR)	PSD REVIEW REQUIRED? (Yes/ No) (2)
TSP	984	25	YES (5)
PM_{10}	964	15	YES
SO_2	5992	40	YES
NO_x	3495	40	YES
CO	7989	100	YES
Ozone	--	(1)	YES
Fluorides	17.0	3	YES (4)
Lead	1.0	0.6	YES (4)
H_2S	--	10	NO
H_2SO_4 Mist	250	7	YES (3)

1) Major for VOC's or NO_x is considered major for Ozone

2) Sources that exceed the significant threshold are required to perform an ambient impact analysis.

3) The potential emissions for H_2SO_4 exceed the PSD threshold, however, the emissions are from virgin fuel burning and are exempt from Standard 8 modeling analysis.

4) This pollutant exceeds the PSD significance level, however, there are no significant impact levels to determine if a full impact analysis is required. These pollutants are addressed in the Standard 2 and 7 modeling analysis and the additional impacts analysis.

5) Although TSP exceeds the PSD significance level, there is no NAAQS value for comparison. This pollutant is addressed in the Standard 2 modeling analysis.

Section B - PSD Class II Modeling Analysis
The PSD Review requires pollutants, which are determined to be "major", be evaluated by an Air Quality Impact Analysis and Additional Impacts Analysis. The Air Quality Impact Analysis consists of (1) a Preliminary Modeling Analysis to determine which pollutants from the proposed project, at the **facility only,** exceed their Class II Significant Impact Levels (SIL); and (2) a more comprehensive Full Impact Analysis based on concentrations of pollutants exceeding the SIL for the facility and additional 'facility-wide' impacts from other facilities that may impact the Significant Impact Area (SIA) or Screening Area (SA). The Additional Impacts Analysis evaluates the impacts on soils, vegetation, and visibility effects, especially on Class I areas.

B.1. PSD Class II Preliminary Modeling Analysis
Potential emission rates or net emission rate increases for each pollutant determined to be significant (Table 13) at the facility were modeled to determine (a) the Significant Impact Level (SIL); (b) the impact area within which a Full Impact Analysis must be performed; and (c) whether or not the facility may be exempted from the ambient monitoring data requirements. Each of these three preliminary Class II analyses is discussed below.

B.1.a. Significant Impact Level (SIL) Analysis
If an SIL is not exceeded, then no further analysis is required. Table 14 provides the results of the SIL modeling analysis for this project, which shows SIL's were exceeded for SO_2 and PM_{10} for each respective averaging period. Therefore, a Full Impact analysis was required for these pollutants. No further PSD analysis is required for CO and NO_x, however, these must be included in the Standard 2 and 7 state modeling. Full Impact analysis assesses the combined impacts of the significant impact pollutants from the facility sources along with those from other sources in the Significant Impact Area (SIA) and the Screening Area as appropriate.

TABLE 14
CLASS II PREVENTION OF SIGNIFICANT DETERIORATION (PSD)
SIGNIFICANT IMPACT LEVEL & SIGNIFICANT MONITORING CONCENTRATION

POLLUTANT	AVERAGING TIME	MODEL USED	MAXIMUM IMPACT ($\mu g/m^3$)	SIL ($\mu g/m^3$)	EXCEEDS (Yes/No)	SIGNIFICANT IMPACT AREA (km)	SIGNIFICANT MONITORING CONCENTRATION ($\mu g/m^3$)
PM_{10}	24 HOUR	AERMOD	33.7	5	YES	2.6	10
	ANNUAL	AERMOD	5.2	1	YES	2.2	N/A
SO_2	3 HOUR(1)	AERMOD	75.1	25	YES	18.0	N/A
	24 HOUR(2)	AERMOD	13.8	5	YES	7.8	13
	ANNUAL(2)	AERMOD	1.6	1	YES	3.1	N/A
NO_x	ANNUAL	AERMOD	0.9	1	NO	N/A	14
CO	1 HOUR	AERMOD	70.5	2000	NO	N/A	N/A

TABLE 14 CLASS II PREVENTION OF SIGNIFICANT DETERIORATION (PSD) SIGNIFICANT IMPACT LEVEL & SIGNIFICANT MONITORING CONCENTRATION							
POLLUTANT	AVERAGING TIME	MODEL USED	MAXIMUM IMPACT ($\mu g/m^3$)	SIL ($\mu g/m^3$)	EXCEEDS (Yes/No)	SIGNIFICANT IMPACT AREA (km)	SIGNIFICANT MONITORING CONCENTRATION ($\mu g/m^3$)
	8 HOUR	AERMOD	39.8	500	NO	N/A	575
Maximum concentrations are used for the Significant Impact Level analysis.							
1) Based on a 3-hour emission rate of 0.24 lb/MMBtu.							
2) Based on a 24-hour emission rate of 0.12 lb/MMBtu.							
Ozone is not modeled, but a general impact assessment is to be made if the source is major for ozone as determined in Table 13.							
There is no SIL for Fluorides, lead, H_2S, and H_2SO_4. TSP is not considered a criteria pollutant for this analysis.							

The Southeastern United States, including South Carolina, is NO_X limited with regards to ozone formation. This means that there is an excess of VOC in the atmosphere with regards to ozone formation and increases in VOC do not lead to increases in ozone production. The excess VOC is in part due to natural sources in the environment. Due to the excess VOC, only increases in NO_X in this region are a concern with regards to ozone formation. Ambient impacts from NO_X are addressed in NO_X modeling. The current 8-hour ozone design value for 2004-2006 at the nearest monitor to the proposed facility is well below the 0.08 ppm standard. As the current air quality in the region is well within acceptable levels and VOC emissions are not expected to impact these levels, a formal analysis of impacts was not completed.

Table 15 provides a summary of the maximum and average potential emission rates of each pollutant included in dispersion modeling to determine significant impact concentrations for the facility only. Emission rates (average or maximum) used to determine long-term (24-hr & annual) and short-term (<24 hour) impacts are identified by footnotes to Table 15. As shown in Table 15, total maximum and total average emission rates for each pollutant exceed the respective PSD Significant Emission Rate Thresholds previously identified in Table 13. A detailed listing of dispersion parameters for each point, volume, and area source included in the SIL analysis, as well as respective emission rates, is included in Section F, Source (Stack) Dispersion Parameters & Modeled Emission Rates.

TABLE 15 SIGNIFICANT IMPACT LEVEL MODELED EMISSION RATE TOTALS			
	SHORT-TERM (lb/hr) (1)	**LONG-TERM (lb/hr) (2)**	**LONG-TERM (TPY) (2)**
PM_{10}	220	220	964
SO_2	2736	1368	5992
NO_x	(3)	798	3495
CO	1824	(4)	(4)

TABLE 15 SIGNIFICANT IMPACT LEVEL MODELED EMISSION RATE TOTALS
1) Maximum emission rates were used for short-term (<24 hr) modeling for SO_2 and CO.
2) Average emission rates were used for long-term (24-hr & annual) modeling for PM_{10}, SO_2 and NO_x.
3) NO_x has no short-term averaging period (Annual impact only).
4) CO has no long-term averaging period (1 and 8 hour only).

B.1.b. Significant Impact Area (SIA) Analysis
Sources within a radius of the facility that is equal to the farthest location where the predicted ambient impact of a pollutant from the project exceeds the Class II SIL, or 50 km, whichever is less, shall be used. An impact area is initially established for each pollutant for every averaging time. Table 14 indicates that the maximum distances to significant impacts are 2.6 km for PM_{10}, 7.8 km for SO_2 24hr period, and 18.0 km for the SO_2 3hr averaging period. For this project, a SIA was set at 50 km, and all sources within the 50 km radius were included. This is a conservative analysis.

B.1.c. Significant Monitoring Concentration Analysis
Modeling significance results for SO_2, PM_{10}, NO_X, and CO are shown below along with significant monitoring concentrations for these pollutants. These concentrations are from SC Regulation 61-62.5, Standard No. 7.

Pollutant	Averaging Period	Max. Impact ($\mu g/m^3$)	Significant Monitoring Concentration ($\mu g/m^3$)	Exceeds (Y or N)
SO_2	24-Hour	14.5	13	Y
PM_{10}	24-Hour	29.8	10	Y
NO_x	Annual	1.6	14	N
CO	8-Hour	47.6	575	N

The maximum impact for NO_x and CO are below the significant monitoring concentration (SMC) levels of 14 and 575 ug/m^3, therefore, no pre-construction monitoring is required. The SO_2 and PM_{10} concentrations exceed the SMC. Since this site can potentially emit greater than 100 tons per year of VOCs, ozone monitoring data also needs to be reviewed. Section 2.4 of U.S. EPA's *Ambient Monitoring Guidelines for Prevention of Significant Deterioration* (EPA-450/4-87-007) permits the use of existing representative air quality data in place of preconstruction monitoring data, provided monitor location, quality of data, and currentness of data are acceptable. There are no existing monitors in the modeled domain. The proposed area for the site is an area that is generally free from the impact of other point sources and area sources associated with human activities. Additionally, the site is located in an area with no complex terrain. According to the EPA document listed above, monitoring data from a regional site may be used as representative data in these cases. The nearest regional monitors for the Pee Dee site for SO_2 and PM_{10} are located in Georgetown, South Carolina. Ozone monitoring data is available from the Indiantown site in Williamsburg County. These monitors are operated by the SC DHEC in support of National Ambient Air Quality Standards attainment activities and meet the quality assurance requirements for this work. The Georgetown monitoring data will provide conservative background data for the Pee Dee site as Georgetown has numerous industrial sources that impact these monitors. The Indiantown site is a rural monitoring site similar to the Pee Dee site. As noted above, SC DHEC operates these monitors in support of their attainment activities. These activities require the data to be quality assured. The level of quality assurance for these monitors meet the requirements for pre-construction monitoring.

Therefore, it has been determined that the data DHEC has obtained for background concentrations are representative of the ambient pollutant concentrations in the area of the proposed facility. In accordance with Chapter C, Section III of the New Source Review Manual (Draft document, dated October 1990), the Bureau approves the use of ambient data collected at DHEC monitoring stations for pre-construction monitoring requirements, thus any further Significant Monitoring Concentration analysis is not required for this project.

B.2. PSD Class II Full Impact Modeling Analysis

A Full Impact Analysis is required for any pollutant for which the proposed source's estimated ambient pollutant concentrations exceed the SIL's (determined in Table 14). Separate analyses are performed for determining compliance with the NAAQS and PSD increments. The NAAQS analysis must also include background pollutant concentrations. The Full Impact Analysis consists of modeling all facilities within the SIA, and those in the SA, which were not excluded by the screening protocol. The SA is usually an area extending 50 km beyond the SIA. The "Screening Threshold Method for PSD Modeling" or "20D Rule" was used to determine which sources within the Screening Area to include.

In order to exclude a source, the annual emissions of a pollutant must be less than 20 times the distance (km) from the SIA to the source for each facility inside the screening area. Each calculated 20D distance was compared to the annual emission of each pollutant. Those sources with annual emissions greater than or equal to 20D were retained and considered in both the Full Impact modeling analysis for the Class II NAAQS analysis and the Class II PSD Increment analysis.

Example Calculation:
Q (tpy) < 20 * D(km)
Q = total annual emissions for source being evaluated for inclusion (each pollutant must be addressed)
D = distance from the SIA boundary to the facility considered for inclusion
Where:
$D = [(x_1 - x_2)^2 + (y_1 - y_2)^2]^{1/2} - R$
R = distance from the PSD Source to the edge of the SIA, or 50km, whichever is less
x_1, y_1 = coordinates of the source being considered for inclusion (km)
x_2, y_2 = coordinates of the PSD Source (km)

For this project, the facility initially included sources between 50 and 65 km in the Screening Analysis. The determined SIA was originally 7.8 km, so the Screening Area would be from 7.8 to 57.8 km. Since the facility has already included all sources out to 50 km, this was a conservative approach. However, the facility decided to increase the allowable permitted short-term SO_2 3-hr rate, which increased the SIA out to 18.0 km, thereby increasing the SA out to 68 km for the SO_2 3-hr averaging period only. This caused additional sources between 57.8 and 68 km to be included in the SA area for the SO_2 3-hr period. There was no change to the SIA inventory since it was already extended out to 50 km.

B.2.a. PSD Class II Full Impact – National Ambient Air Quality Standards (NAAQS) Analysis

Table 16 shows a list of facilities that are included in the full impact analysis for NAAQS modeling.

TABLE 16 CLASS II FULL IMPACT ANALYSIS - NAAQS SIA AND 20D SOURCES			
PM_{10}	SO_2	NO_x	CO
Darlington Veneer	Nucor Steel Darlington	N/A	N/A
Wellman, Inc. - Darlington	Hartsville Oil Mill	N/A	N/A
HRS Textiles, Inc.	Wellman, Inc. - Darlington	N/A	N/A
Chesterfield Lumber	HRS Textiles, Inc.	N/A	N/A
PowerSecure, Inc.	PowerSecure, Inc.	N/A	N/A
Lockamy Scrap Metal	Paperboard Industries Corp.	N/A	N/A
Paperboard Industries Corp.	Stone Container	N/A	N/A
Talon, Inc.	Carter Manufacturing	N/A	N/A
A.C. Monk	Wellman – Florence	N/A	N/A
Stone Container	Tyler Plywood Corporation	N/A	N/A
Carter Manufacturing	Koppers Industries	N/A	N/A
Wellman – Florence	Marsh Lumber Company	N/A	N/A
Tyler Plywood Corporation	The ESAB Group	N/A	N/A
Koppers Industries	Dupont-Florence	N/A	N/A
Marsh Lumber Company	Charles Ingram Lumber Co	N/A	N/A
The ESAB Group	La-Z-Boy East	N/A	N/A
Dupont-Florence	McLeod Regional Medical Center	N/A	N/A
Charles Ingram Lumber Co	Sara Lee Hosiery	N/A	N/A
La-Z-Boy East	Asea Brown Boveri	N/A	N/A
McLeod Regional Medical Center	Vulcraft-Div. of Nucor	N/A	N/A
Sara Lee Hosiery	Maytag Florence Operations	N/A	N/A
Asea Brown Boveri	McCall Farms	N/A	N/A
Vulcraft-Div. of Nucor	Roche Carolina	N/A	N/A
Maytag Florence Operations	Florence Wastewater Treatment	N/A	N/A

TABLE 16 CLASS II FULL IMPACT ANALYSIS - NAAQS SIA AND 20D SOURCES			
Nan Ya Plastics	Francis Marion University	N/A	N/A
McCall Farms	Carolinas Hospital System	N/A	N/A
Roche Carolina	Honda	N/A	N/A
Florence Wastewater Treatment	Duquesne Energy	N/A	N/A
Francis Marion University	Southern Impressions, LLC	N/A	N/A
Carolinas Hospital System	Gatewood Products, LLC	N/A	N/A
Honda	Crenlo, Inc	N/A	N/A
Duquesne Energy	Flav-O-Rich	N/A	N/A
Southern Impressions, LLC	International Paper - Pulp & Paper Mill	N/A	N/A
Gatewood Products, LLC	Georgetown Steel, Inc.	N/A	N/A
Crenlo, Inc	Santee Cooper – Winyah	N/A	N/A
Flav-O-Rich	Oneita Industries	N/A	N/A
International Paper - Pulp & Paper Mill	Santee Cooper-Grainger Station	N/A	N/A
Georgetown Steel, Inc.	PPM Cranes, Inc.	N/A	N/A
International Paper - Sampit Lumber	Wolverine Brass, Inc.	N/A	N/A
Santee Cooper-Grainger Station	Embers Charcoal Company	N/A	N/A
PPM Cranes, Inc.	Santee Cooper - Myrtle Beach	N/A	N/A
Wolverine Brass, Inc.	Uniblend Spinners	N/A	N/A
Embers Charcoal Company	NewSouth, Inc.	N/A	N/A
Santee Cooper - Myrtle Beach	Conway Hospital	N/A	N/A
Uniblend Spinners	Allied Signal Metglas Products	N/A	N/A
NewSouth, Inc.	Grand Strand WW treatment plant	N/A	N/A
Conway Hospital	Horry Co. SWA	N/A	N/A
Allied Signal Metglas Products	Santee Cooper Horry Co. Landfill	N/A	N/A
Horry County	Fabric Resources Intl. Ltd.	N/A	N/A
Grand Strand WW treatment plant	Cone Mills-Raytex Finishing	N/A	N/A
Bayshore Concrete Products	International Paper	N/A	N/A
Horry Co. SWA	Pilliod Furniture	N/A	N/A
Santee Cooper Horry Co. Landfill	Marion Memorial Hospital	N/A	N/A
Fabric Resources Intl. Ltd.	Blumenthal Mills, Inc.	N/A	N/A
Cone Mills-Raytex Finishing	Mullins Hospital	N/A	N/A
International Paper	Marion Ceramics	N/A	N/A
Pilliod Furniture	Piggly Wiggly #54	N/A	N/A
Marion Memorial Hospital	Russell Stover Candy	N/A	N/A
Blumenthal Mills, Inc.	SO-PAK-CO, INC.	N/A	N/A
Mullins Hospital	Wellman, Inc. – Marion	N/A	N/A
AVM of South Carolina	Sara Lee Hosiery	N/A	N/A

TABLE 16 CLASS II FULL IMPACT ANALYSIS - NAAQS SIA AND 20D SOURCES			
Marion Ceramics	Heritage Sportswear	N/A	N/A
Piggly Wiggly #54	Marion Co. Medical Center	N/A	N/A
Russell Stover Candy	Forest Industries International, Inc.	N/A	N/A
SO-PAK-CO, INC.	Mohawk Carpets - Oak River Mill	N/A	N/A
Wellman, Inc.	Martek	N/A	N/A
Sara Lee Hosiery	Colonial Rubber	N/A	N/A
Heritage Sportswear	Williamsburg Co. Mem. Hospital	N/A	N/A
Marion Co. Medical Center	Burns Philip Food	N/A	N/A
Forest Industries International, Inc.	Firestone Building Products	N/A	N/A
Martek	Milliken-Kingstree Plant	N/A	N/A
Colonial Rubber	Nan Ya Plastics	N/A	N/A
Williamsburg Co. Mem. Hospital		N/A	N/A
Burns Philip Food		N/A	N/A
Don's Scrap Iron & Metal, Inc.		N/A	N/A
Firestone Building Products		N/A	N/A
Milliken-Kingstree Plant		N/A	N/A
Nan Ya Plastics		N/A	N/A

Table 17 shows that when proposed facility emissions are modeled with other sources in the SIA and SA and background values are added, the Ambient Air Quality Standards are not exceeded and compliance has been demonstrated.

Table 17
AMBIENT AIR QUALITY STANDARDS
CLASS II FULL IMPACT ANALYSIS

Pollutant	Averaging Time	Model Used	Maximum Modeled Concentration ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)	Total ($\mu g/m^3$)	Standard ($\mu g/m^3$)	% of Standard
PM_{10}	24 Hour	AERMOD	28.8	49.0	77.8	150	51.9
	Annual	AERMOD	5.6	23.5	29.1	50	58.2
SO_2	3 Hour	AERMOD	212.4 (1)	146.6	359.0	1300	27.6
	24 Hour	AERMOD	134.4 (2)	34.0	168.4	365	46.1
	Annual	AERMOD	34.4 (2)	4.7	39.1	80	48.9
Backgrounds are summarized in Table 31.							
The highest-first-high modeled concentrations for the 5 years of Meteorological data are listed for annual averaging periods and the highest second-high for other averaging periods.							
1) Based on 0.24 lb/MM Btu emission rate.							

2) Based on 0.12 lb/MM Btu emission rate.

Total long-term (24-hr & annual) and short-term (<24 hours) modeled emission rates for the AAQS Full Impact analysis are summarized below. A detailed listing of dispersion parameters of each source, as well as, each respective modeled emission rate included in the Class II AAQS Full Impact analysis, is included in the facility's application (dated July 2006, May 2007, and additional correspondence) and the corresponding electronic modeling files. Those tables were not re-produced for this summary due to their length.

TABLE 18 FULL IMPACT ANALYSIS MODELED EMISSION RATE TOTALS			
	SHORT-TERM (lb/hr) (1)	**LONG-TERM (lb/hr) (2)**	**LONG-TERM (TPY) (2)**
PM_{10}	N/A	3129	13,705
SO_2	34,228	18,490	80,986
1) Maximum emission rates were used for short-term (3-hr) modeling for SO_2			
2) Average emission rates were used for long-term (24 & annual) modeling for PM_{10} and SO_2.			

B.2.b. PSD Class II Full Impact - PSD Increment Analysis

The full impact analysis for PSD increment consuming sources is performed in the same manner as the full impact analysis for the NAAQS shown above. The sources included are all increment consuming sources from the facility and those previously identified within the SIA and SA.

Table 19 provides a summary of the facility-wide maximum and average projected emission increases of Standard No. 7 pollutants anticipated from the facility as a result of this project.

TABLE 19 STANDARD NO. 7 - CLASS II PREVENTION OF SIGNIFICANT DETERIORATION FACILITY-WIDE INCREMENT EMISSION INCREASES				
AVERAGE (LONG-TERM) EMISSION INCREASE (1)				
POLLUTANT	**MSBD**	**MSBD ACTUAL EMISSIONS**	**FUTURE POTENTIAL EMISSIONS**	**EMISSION RATE INCREASE**
PM_{10}	9/28/78	0	220 LB/HR	964 TPY
SO_2	9/28/78	0	1368 LB/HR	5992 TPY
MAXIMUM (SHORT-TERM) EMISSION INCREASE (2)				
POLLUTANT	**MSBD**	**MSBD ACTUAL EMISSIONS**	**FUTURE POTENTIAL EMISSIONS**	**EMISSION RATE INCREASE**
PM_{10}	9/28/78	0	220 LB/HR	220 LB/HR
SO_2	9/28/78	0	2736 LB/HR	2736 LB/HR

1) Average emission increases of PM_{10} and SO_2 are used for long-term modeling (24-hr and annual) analyses.
2) Maximum (or instantaneous) emission increases of PM_{10} and SO_2 are used for short-term modeling (<24 hours) analyses.

TABLE 20
PSD CLASS II FULL IMPACT ANALYSIS
SIA and 20D PSD INCREMENT CONSUMING SOURCES

PM_{10}	SO_2	NO_x
Wellman, Inc. - Darlington	Nucor Steel Darlington	N/A
HRS Textiles, Inc.	Wellman, Inc. – Darlington	N/A
Chesterfield Lumber	HRS Textiles, Inc.	N/A
PowerSecure, Inc.	PowerSecure, Inc.	N/A
Paperboard Industries Corp.	Paperboard Industries Corp.	N/A
Talon, Inc.	Talon, Inc.	N/A
A.C. Monk	A.C. Monk	N/A
Stone Container	Stone Container	N/A
Carter Manufacturing	Carter Manufacturing	N/A
Wellman – Florence	Wellman – Florence	N/A
Tyler Plywood Corporation	Koppers Industries	N/A
Koppers Industries	Dupont-Florence	N/A
Marsh Lumber Company	Charles Ingram Lumber Co	N/A
The ESAB Group	La-Z-Boy East	N/A
Dupont-Florence	McLeod Regional Medical Center	N/A
Charles Ingram Lumber Co	Sara Lee Hosiery	N/A
La-Z-Boy East	Asea Brown Boveri	N/A
McLeod Regional Medical Center	Vulcraft-Div. of Nucor	N/A
Sara Lee Hosiery	Maytag Florence Operations	N/A
Asea Brown Boveri	NanYa Plastics	N/A
Vulcraft-Div. of Nucor	McCall Farms	N/A
Maytag Florence Operations	Roche Carolina	N/A
Nan Ya Plastics	Florence Wastewater Treatment	N/A
McCall Farms	Francis Marion University	N/A
Roche Carolina	Carolinas Hospital System	N/A
Florence Wastewater Treatment	Honda	N/A
Francis Marion University	Duquesne Energy	N/A
Carolinas Hospital System	Southern Impressions, LLC	N/A
Honda	Gatewood Products, LLC	N/A
Duquesne Energy	Crenlo, Inc	N/A
Southern Impressions, LLC	Flav-O-Rich	N/A
Gatewood Products, LLC	International Paper - Pulp & Paper Mill	N/A
Crenlo, Inc	Georgetown Steel, Inc.	N/A

TABLE 20 PSD CLASS II FULL IMPACT ANALYSIS SIA and 20D PSD INCREMENT CONSUMING SOURCES		
PM_{10}	SO_2	NO_x
Flav-O-Rich	Santee Cooper - Winyah	N/A
International Paper - Pulp & Paper Mill	Fabric Resources Intl. Ltd.	N/A
Georgetown Steel, Inc.	Cone Mills-Raytex Finishing	N/A
International Paper - Sampit Lumber	International Paper - Marion	N/A
Santee Cooper-Grainger Station	Pilliod Furniture	N/A
PPM Cranes, Inc.	Marion Memorial Hospital	N/A
Wolverine Brass, Inc.	Blumenthal Mills, Inc.	N/A
Embers Charcoal Company	Mullins Hospital	N/A
Uniblend Spinners	AVM of South Carolina	N/A
NewSouth, Inc.	Marion Ceramics	N/A
Conway Hospital	Piggly Wiggly #54	N/A
Allied Signal Metglas Products	Russell Stover Candy	N/A
Grand Strand WW treatment plant	SO-PAK-CO, INC.	N/A
Bayshore Concrete Products	Wellman, Inc. – Marion	N/A
Horry Co. SWA	Sara Lee Hosiery	N/A
Santee Cooper Horry Co. Landfill	Heritage Sportswear	N/A
Fabric Resources Intl. Ltd.	Marion Co. Medical Center	N/A
Cone Mills-Raytex Finishing	Forest Industries International, Inc.	N/A
International Paper		N/A
Pilliod Furniture		N/A
Marion Memorial Hospital		N/A
Blumenthal Mills, Inc.		N/A
Mullins Hospital		N/A
AVM of South Carolina		N/A
Marion Ceramics		N/A
Piggly Wiggly #54		N/A
Russell Stover Candy		N/A
SO-PAK-CO, INC.		N/A
Wellman, Inc. – Marion		N/A
Sara Lee Hosiery		N/A
Heritage Sportswear		N/A
Marion Co. Medical Center		N/A
Forest Industries International, Inc.		N/A
Martek		N/A
Colonial Rubber		N/A
Williamsburg Co. Mem. Hospital		N/A

TABLE 20 PSD CLASS II FULL IMPACT ANALYSIS SIA and 20D PSD INCREMENT CONSUMING SOURCES		
PM_{10}	SO_2	NO_x
Burns Philip Food		N/A
Don's Scrap Iron & Metal, Inc.		N/A
Firestone Building Products		N/A
Milliken-Kingstree Plant		N/A

The rates in Table 19 were combined with those from additional non-facility sources identified in Table 20 and included in the PSD Class II Full Impact Increment modeling analysis. Table 21 indicates that the maximum impact for each averaging period and each pollutant was determined to be less than the PSD increment standard for each averaging period. Highest-first-high values were used for annual averaging periods and highest-second-high for all short-term averaging periods.

TABLE 21 CLASS II PREVENTION OF SIGNIFICANT DETERIORATION FULL IMPACT INCREMENT ANALYSIS					
POLLUTANT	AVERAGING TIME	MODEL USED	MAXIMUM MODELED CONCENTRATION ($\mu g/m^3$)	STANDARD ($\mu g/m^3$)	% of Standard
PM_{10}	24 HOUR	AERMOD	28.0	30	93.3
	ANNUAL	AERMOD	5.2	17	30.6
SO_2	3 HOUR	AERMOD	91.8 (1)	512	17.9
	24 HOUR	AERMOD	31.3 (2)	91	34.4
	ANNUAL	AERMOD	5.5 (2)	20	27.5
1) Based on 0.24 lb/MM Btu emission rate for Santee Facility.					
2) Based on 0.12 lb/MM Btu emission rate for Santee Facility.					

Total long-term (24-hr & annual) and short-term (<24 hours) modeled emission rates for the Class II PSD Increment Full Impact analysis are summarized in Table 22. Dispersion parameters of each point, volume, and area source, as well as, each respective modeled emission rate included in the PSD Increment Class II Full Impact analysis are included in the facility's application (Dated July 2006, and subsequent revisions and/or additions) and the corresponding electronic modeling files. Those tables were not re-produced for this summary due to their length.

TABLE 22 CLASS II PSD INCREMENT FULL IMPACT ANALYSIS MODELED EMISSION RATE TOTALS			
	SHORT-TERM (lb/hr) (1)	LONG-TERM (lb/hr) (2)	LONG-TERM (TPY) (2)
PM_{10}	-203.1	-203.1	-889.6
SO_2	2397	-526.1	-2304

TABLE 22 CLASS II PSD INCREMENT FULL IMPACT ANALYSIS MODELED EMISSION RATE TOTALS
1) Maximum emission rates were used for short-term (<24 hr) modeling for PM_{10} and SO_2.
2) Average emission rates were used for long-term (24-hr and annual) modeling for PM_{10} and SO_2.

Section C – Additional Impact Analysis – Growth, Soils & Vegetation, and Visibility Impairment

PSD review requires an analysis of any potential impairment to visibility, soils, and vegetation that may occur as a result of the proposed or modified facility/sources. The review also requires an analysis of the air quality impact projected for the area as a result of general commercial, residential, industrial, and other growth associated with the expansion.

C.1. Growth

The SC PSD rules require the applicant to provide information relating to the nature and extent of air quality impacts from all commercial, residential, industrial and other growth, which has occurred since August 7, 1977, in the area the facility, or modification, would affect. For the purposes of this report, the area the facility would affect is defined as the area of significant impact. The greatest significant impact distance was determined to be 7.0 km around the plant. The construction and modification of the facility and any workforce growth associated residential and commercial growth is not expected to cause or contribute a quantifiable adverse impact on local ambient air quality.

C.2. Soils and Vegetation

Maximum predicted offsite impacts were compared to EPA screening levels or other available air quality standards. The annual SO_2 impacts exceed the EPA screening concentration, however, the receptors where the exceedances occur are located adjacent to the Marsh Lumber inventory source. These receptors are likely on the property of that facility. The largest annual concentration from Pee Dee sources at those receptors is 0.2 ug/m3, which is below the significance level. Modeling of all the proposed and existing emissions for the soils and vegetation analysis indicated that the maximum concentrations for all averaging times were less than each applicable standard. Thus, there are no adverse impacts expected on soils or vegetation based on facility emissions.

TABLE 23
SOILS AND VEGETATION ANALYSIS

Pollutant	Averaging Time	Model Used	Facility / Regional Impact ($\mu g/m^3$)	EPA Screening Concentration ($\mu g/m^3$)	AAQS Standard ($\mu g/m^3$)	Exceeds?
PM_{10}	24 Hour	AERMOD	77.8	N/A	150	No
	Annual	AERMOD	29.1 (2)	N/A	50	No
SO_2	1 Hour	AERMOD	508.2 (2)	917	N/A	No
	3 Hour	AERMOD	354.5 (2)	786	1300	No

	Annual	AERMOD	37.4 (2)	18	80	No
NO_x (1, 2, 3)	4 Hour (3)	AERMOD	20.1 (1)	3760	N/A	No
	8 Hour (3)	AERMOD	17.4 (1)	3760	N/A	No
	1 Month (3)	AERMOD	2.06 (1)	564	N/A	No
	Annual	AERMOD	19.9 (1,2)	94	100	No
CO (1, 4)	1 Week (4)	AERMOD	2559 (1)	1,800,000	N/A	No
Fluoride	10 Day (4)	AERMOD	0.003 (1)	1.5	- -	No
Lead	Quarterly (6)	AERMOD	0.003 (1)	1.5	- -	No
Sulfuric Acid Mist	24 Hour (4)	AERMOD	2.2 (1,7)	- -	- -	No

1) Concentrations include only the facility impacts since they either did not exceed the Significant Impact Levels or none were available.

2) Results include background values.

3) Averaging period concentrations were determined directly using selected periods in modeling software, and not by applying conversion factors to a 1-hour concentration. Highest first high concentrations were used for comparison.

4) Non-Standard Averaging period was conservatively estimated as follows:
1 Week CO = 8-hour Average
10 Day Fluoride = 24 hour concentration
24 Hour Sulfuric Acid Mist = 1 hour concentration

5) Standard 8 concentration was used since there was no EPA level available.

6) Quarterly impacts are calculated using the DHEC conversion factor of 0.3 times the hourly impact.

7) Concentration based on initial SO_4 runs at a higher emission rate and including additional sources that have since been removed.

C.3. Visibility

This visibility impairment analysis is distinct from the Class I visibility impact analysis. VISCREEN was used following the guidelines published in the *Workbook for Plume Visual Impact Screening and Analysis* (EPA-450/4-88-015, 1988). The procedure consists of a screening process done through several levels. A nearby sensitive receptor, such as a state park or local airport, is analyzed to determine if an impact is expected. The Lake city airport located 27 km southwest of the facility was used for this analysis. Calculations were performed for two assumed plume-viewing backgrounds: the horizon sky and a dark terrain object. As shown in the Table below, the screening values are below the thresholds for the Lake City airport.

TABLE 24 (a)
VISIBILITY IMPAIRMENT ANALYSIS

Background	Theta	Azi	Distance (km)	Alpha	ΔE Critical	ΔE Plume	Contrast Critical	Contrast Plume
Sky	10	95	28	74	2.0	1.6	0.05	0.006

Sky	140	95	28	74	2.0	0.6	0.05	-0.015
Terrain	10	84	27	84	2.0	1.1	0.05	0.015
Terrain	140	84	27	84	2.0	0.3	0.05	0.012

TABLE 24 (b) VISIBILITY IMPAIRMENT ANALYSIS INPUTS		
Parameter	**Value**	**Units**
Particulate Matter	205.2	lb/hr
NOx	798	lb/hr
Primary Sulfur	57	lb/hr
Background Ozone	0.04	ppm
Plume-source-observer angle	11.25	Degrees
Background visual range	25	km
Wind Speed	3	m/s
Stability Class	E	

Section D – PSD Class I Impact Analysis

A facility within 100 km of a Class I area must perform Class I modeling to determine the impact on the Class I area. For the visibility and deposition analyses, the recommendations in the; 1) *Interagency Workgroup on Air Quality Modeling Phase II Summary Report and Recommendations for Modeling Long Range Transport Impacts (IWAQM)* (EPA-454/R-98-019, December 1998); 2) *Federal Land Managers' Air Quality Related Values Workgroup Phase I Report (FLAG)* (U.S. Forest Service- Air Quality Program, the National Park Service – Air Resources Division, and the U.S. Fish & Wildlife Service – Air Quality Branch, December 2000); 3) *Regional Haze Regulations and Guidelines for Best Available Retrofit Technology* (U.S. EPA, June 15, 2005); and 4) U.S. EPA's *Guidelines on Air Quality Models (Guideline)*, were followed.

Dispersion modeling was performed to evaluate the potential impacts to the Cape Romain National Wildlife Refuge, located approximately 100 km to the south of the proposed Kingsburg facility. Given the complex nature of the meteorology in a shoreline environment and the recommendations of the various regulatory agencies, the CALPUFF model was used for performing all of the air dispersion modeling for this project. Modified MM5 (mesoscale meteorological forecast model) data for 2001, 2002, and 2003 was used in CALMET (version 5.53a) to provide input into CALPUFF (version 5.711a). CALPOST (version 5.51) was used as the postprocessor to generate the ambient concentrations of PM_{10}, SO_2, and NO_x at the Class I areas for comparison to; 1) the PSD Class I increment modeling significance level; 2) the total deposition of sulfur and nitrogen for assessment against the deposition assessment threshold values for sulfate and nitrate set by the FLM (DAT); and 3) the 24-hour average visibility impairment.

CALPUFF modeling was not performed by SCDHEC for this project, but was accepted by South Carolina upon approval of the Federal Land Manager. A summary of Class I impact results, as provided in the July 2006 and April 2007 submittals, is provided below. All modeling was performed using a refined grid modeling approach in the CALPUFF modeling system. Based on this dispersion, deposition, and visibility modeling, the ambient air impacts of the project were estimated to be less than all threshold levels specified by all applicable regulatory requirements except for the short-term SO_2 impacts on the Cape Romain NWR. Air impacts of increased SO_2 emissions were greater than the applicable SILs for the 3-hr and 24-hr averaging periods, which required an additional cumulative impact analysis to be performed. Other sources of SO_2 emissions within the modeling domain, which consume PSD increment (or expand the increment if no longer in service), were obtained from DHEC. Cumulative air quality modeling for the Cape Romain Class I receptors was performed for these sources combined with the facility sources. The cumulative PSD increment impacts were less than the Class I area allowable PSD increments.

D.1. Class I Significant Impact Level Analysis

Table 25 shows the maximum impacts on Cape Romain for SO_2, NO_x, and PM_{10}. The air quality impacts are less than the Class I SILs for PM_{10}, NO_x, and the SO_2 annual averaging period. The impacts of the facility emissions are greater than the applicable Class I SIL for SO_2, for the 3-hour and 24-hour averaging periods. Therefore, for the SO_2 3-hour and 24-hour averaging periods, a cumulative impact analysis is required. No further air concentration analyses are required to demonstrate compliance with the PSD increments for PM_{10}, NO_x, and the SO_2 annual averaging period.

Table 25
CLASS I PSD SIGNIFICANT IMPACT LEVEL ANALYSIS

Pollutant	Averaging Time	Model Used	Maximum Modeled Concentration ($\mu g/m^3$)	SIL ($\mu g/m^3$)	Significant Impact?
PM_{10}	24 HOUR	CALPUFF	0.076	0.32	No
	ANNUAL	CALPUFF	0.003	0.16	No
SO_2	3 HOUR	CALPUFF	2.498	1.0	Yes
	24 HOUR	CALPUFF	0.819	0.2	Yes
	ANNUAL	CALPUFF	0.027	0.1	No
NO_X	ANNUAL	CALPUFF	0.009	0.1	No

Highest First-high values is shown for all pollutants and averaging periods.

D.2. Class I Increment Consumption Impact Analysis

PSD increment consuming and increment expanding sources for SO_2 in the modeling domain were considered in this analysis. The modeling domain was determined by; 1) developing a list of all sources within 100 km of the facility; 2) including all increment sources less than 100 km from Cape Romain; 3) for sources between 100 and 200 km from Cape Romain, including sources if the facility total increment potential emissions were greater than 100 TPY of any PSD pollutant; and 4) for sources greater than 200 km from Cape Romain, including sources if the facility total increment potential emissions were greater than 250 TPY of any PSD pollutant.

Additional CALPUFF modeling for these increment-affecting sources was performed over the whole modeling domain for impacts on the Cape Romain NWR. The results of these cumulative effects are shown in Table 26. As shown, these impacts do not exceed the allowable PSD increments for a Class I area.

TABLE 26
CLASS I PSD INCREMENT IMPACTS
CAPE ROMAIN NATIONAL WILDLIFE REFUGE

Pollutant	Averaging Time	Model Used	Maximum Modeled Concentration ($\mu g/m^3$)	Standard ($\mu g/m^3$)	% of Standard?
SO_2	3 HOUR	CALPUFF	16.1	25	64
	24 HOUR	CALPUFF	4.7	5	94
	ANNUAL	CALPUFF	0.5	2	25
Highest First-high values is shown for all averaging periods.					
Standards are from SC Regulation 61-62.5 Standard 7, Class I Area limits.					

D.3. Class I Visibility Analysis

The visibility analysis evaluates the potential change in light extinction relative to the natural background as a result of the proposed project. Visibility is described through two methods, Plume Impairment and Regional Haze. Regional haze occurs at distances where the plume has become evenly dispersed into the atmosphere such that there is no definable plume. The revised EPA guidance (IWAQM, 1998) and the FLM guidance (FLAG, 2000) recommends the use of non-steady state dispersion modeling for both screening and refined dispersion modeling.

Plume impairment was not evaluated for this project since the distance from the facility to the Cape Romain NWR was greater than 50 km. Only regional haze was evaluated.

The peak 24-hour visibility impairment as predicted by the air quality model is typically used to attribute visibility affects to a single source. However, the recently promulgated Regional Haze Regulations and *Guidelines for Best Available Retrofit Technology* establish a different method for assessing whether a single facility causes or contributes to visibility impairment. This guidance establishes a 0.5 deciview (dv) (roughly equivalent to 5% extinction change) threshold for contribution and 1.0 dv (approximately 10% extinction change) threshold for causation of visibility impairment. These thresholds are essentially equivalent to the FLAG guidance, except that they are to be applied to the 98th percentile model result for an analysis that considers multiple years of met data. Visibility modeling results are presented at both peak and 98th percentile levels to demonstrate two interpretations of the model results. This analysis utilizes the Visibility Improvement State and Tribal Association of the Southeast (VISTAS) version of the CALPOST processor to assess impacts from the proposed project on regional haze.

The IWAQM recommended "Method 2", which uses hourly relative humidity adjustment applied to background and modeled sulfate and nitrate with the relative humidity factor capped at 95%, was used to compute visibility impairment in terms of Δb_{ext} from modeled pollutant concentrations. This post-processing option uses observed relative humidity values and pollutant concentrations at each receptor to compute the percent change in visibility due to the facility's emissions compared against the natural background visibility under the prevailing atmospheric conditions. Method 2 is considered the default approach under FLAG and the results are shown in Table 27. The New IMPROVE equation incorporates many natural background scattering processes in an attempt to isolate true source contribution.

TABLE 27
CLASS I AREA VISIBILITY IMPAIRMENT ANALYSIS AT CAPE ROMAIN NATIONAL WILDLIFE REFUGE DUE TO PROPOSED SANTEE PEE DEE USING METHOD 2

Year	Method 2			
	Maximum Impact	98th Percentile	Number Days >5%	Number Days >10%
2001	10.97%	5.24%	8	2
2002	9.31%	5.33%	10	0
2003	28.37%	4.68%	5	1
	Method 2 with IMPROVE tool			
2001	7.78%	3.98%	5	0
2002	7.00%	4.07%	2	0
2003	21.37%	3.51%	3	1

The "Method 6" approach, computes Δb_{ext} using a monthly average relative humidity adjustment particular to each Class I area applied to background and modeled sulfate and nitrate. Because a monthly average is used, no cap on *f*(RH) is necessary since the function is not used in Method 6. The results tend to be smoothed out since peak short-term humidity events are not considered. Method 6 is not typically considered a default approach for PSD AQRV analyses, but is used to assess visibility impairment under the U.S. EPA's G*uidance for Best Achievable Retrofit Technology*, in particular in the VISTAS regional planning organization. When using this methodology, the light extinction change above background extinction that is compared to the 5% threshold is set at the 98th percentile value from the modeling. This translates into the 8th highest visibility impact or light extinction change above background in a given year being compared to the 5% threshold change.

Table 28 provides the visibility impacts for each year of meteorological data and shows the 8th highest value for each year of analysis.

TABLE 28
CLASS I AREA VISIBILITY IMPAIRMENT ANALYSIS AT CAPE ROMAIN NATIONAL WILDLIFE REFUGE USING METHOD 6

Method 6			
Maximum Impact	98th Percentile	Number Days >5%	Number Days >10%
13.85%	4.07%	5	1

TABLE 28 CLASS I AREA VISIBILITY IMPAIRMENT ANALYSIS AT CAPE ROMAIN NATIONAL WILDLIFE REFUGE USING METHOD 6			
Method 6 with IMPROVE tool			
10.18%	2.98%	4	1

As shown, the facility does show exceedances of the 5% threshold on the highest impact day. However, as evidenced by the 98th percentile values (8th highest day), these high days occur very infrequently. Therefore, taking into account the intensity, duration, frequency, and time of visibility impairment, the impacts from the facility do not create an adverse impact on visibility.

D.4. Class I Deposition Analysis

For the sulfate/nitrate deposition analysis, modeling was performed for the Class I area following the refined CALPUFF methodology outlined above. Table 29 presents the annual deposition values for each Class I area compared to the Deposition Analysis Threshold (DAT) for sulfur and nitrogen deposition of 0.01 kg/ha/yr. These DAT values are a guideline established by the FLM, not a regulatory standard. The estimated nitrate deposition was less than the applicable DAT and the sulfate deposition was slightly higher than the East U.S. DAT. Considering that coastal ecosystems have evolved under naturally higher sulfur deposition rates, an adverse impact on the Cape Romain NWR is not expected.

TABLE 29 SULFATE/NITRATE DEPOSITION AT CAPE ROMAIN NATIONAL WILDLIFE REFUGE – SIL EMISSIONS					
Deposition Rate (kg/ha/yr)					
Sulfur	**DAT**	**Exceeds**	**Nitrogen**	**DAT**	**Exceeds**
0.021	0.01	Yes	0.004	0.01	No

Section E – South Carolina Facility-Wide Compliance Demonstration

All minor and major sources proposing new construction or construction modifications in South Carolina are required to demonstrate compliance with South Carolina Regulation No. 62.5 Standards Nos. 2 (AAQS), 7 (Class II PSD Increment), and 8 (Air Toxics). Standard No. 7 (PSD) Part k - "Source Impact Analysis" and Part p - "Sources Impacting Federal Class I Areas - Additional Requirements" require Class II modeling. Facility-wide emissions from the Santee Cooper Pee Dee facility only were modeled to demonstrate compliance with Standards 2 and 7. Emission rates included in this portion of the compliance demonstration are listed in Attachment A of the draft permit.

TABLE 30 STANDARD NO. 2 - AAQS MODELING ANALYSIS							
Pollutant	Averaging Time	Model Used	Maximum Modeled Concentration ($\mu g/m^3$) (1)	Background Concentration ($\mu g/m^3$)	TOTAL ($\mu g/m^3$)	Standard ($\mu g/m^3$)	% of Standard
TSP	Annual	AERMOD	10.1	22.4	32.5	75	43.3
PM_{10}	24 Hour	AERMOD	29.8 (2)	49	78.8	150	52.5
	Annual	AERMOD	5.2	23.5	28.7	50	57.4
SO_2	3 Hour	AERMOD	75.1	146.6	221.7	1300	17.1
	24 Hour	AERMOD	13.8	34.0	47.8	365	13.1
	Annual	AERMOD	1.6	4.7	6.3	80	7.9
NO_2	Annual	AERMOD	0.9	19.0	19.9	100	19.9
CO	1 Hour	AERMOD	70.5	2863	2934	40,000	7.3
	8 Hour	AERMOD	39.8	2519	2559	10,000	25.6
Lead	Quarterly	AERMOD	0.0027 (3)	0.004	0.007	1.5	0.5
Gaseous Fluorides	12 Hour	AERMOD	0.06	(4)	0.06	3.7	1.6
	24 Hour	AERMOD	0.04	(4)	0.04	2.9	1.4
	Weekly	AERMOD	0.04	(4)	0.04	1.6	2.5
	Monthly	AERMOD	0.01	(4)	0.01	0.8	1.2
1) Highest first-high modeled concentration was used for all averaging times, unless otherwise noted.							
2) Highest second-high modeled concentration.							
3) Quarterly impacts are calculated using the DHEC conversion factor of 0.3 times the hourly impact.							
4) There is no background value for HF.							
5) The 24-hour average concentration was used to compare to the weekly standard. This is a conservative approach.							

TABLE 31 BACKGROUND MONITORING DATA ($\mu g/m^3$)									
Pollutant	Site Name	County	Year	1-Hr	3-Hr	8-Hr	24-Hr	Qtr	Annual
TSP	Sneed Middle School	Florence	2005						22.4
PM_{10}	Winyah	Georgetown	2005				49		23.5
SO_2	Georgetown CMS	Georgetown	2005	264.4	146.6		34.0		4.7
NO_2	Jenkins Ave Fire Station	Charleston	2005						19.0
CO	State Hospital	Richland	2005	2863		2519			
Pb	Sneed Middle School	Florence	2005					0.004	

Mean was used for Annual Averaging Time and 2nd high was used for all other averaging periods. Pb is the highest of the four quarters.

TABLE 32 STANDARD NO. 7 - CLASS II PSD MODELING ANALYSIS					
POLLUTANT	**AVERAGING TIME**	**MODEL USED**	**MAXIMUM MODELED CONCENTRATION ($\mu g/m^3$) (1)**	**STANDARD ($\mu g/m^3$)**	**% of Standard**
PM_{10}	24 Hour	AERMOD	29.8 (2)	30	99.3
	Annual	AERMOD	5.2	17	30.6
SO_2	3 Hour	AERMOD	75.1	512	14.7
	24 Hour	AERMOD	13.8	91	15.2
	Annual	AERMOD	1.6	20	8.0
NO_2	Annual	AERMOD	0.9	25	3.6
1) Highest first-high modeled concentration was used for all averaging times, unless otherwise noted.					
2) Highest second-high modeled concentration.					

Impact on Non-Attainment Areas

There are currently no non-attainment areas for any pollutants which will be emitted by the proposed Pee Dee Generating Station within 50 kilometers of the Florence County plant site. Therefore, no impact analysis on non-attainment areas was required. Due to possible re-classification of areas surrounding this facility to non-attainment for ozone or PM in the future, DHEC retains the authority to reopen the facility's permit to address the ozone or PM standards should the re-classification occur.

Air Toxics Impacts

As allowed by SC DHEC Regulation 61-62.5, Standard No. 8, *Toxic Air Pollutants*, fuel burning sources which burn only virgin fuel or specified used oil are not subject to this standard. Santee Cooper plans to burn virgin coal including petcoke as well as natural gas or fuel oil for start-ups and therefore is not subject to Standard No. 8. Although Standard No. 8 is not applicable, many air toxic emissions including metal compounds and acid gases will be reduced by the control devices used to control PM, SO_2, and NO_x emissions.

Appendix A

Public Notice of Draft Permit No. 1040-0113-CA and Public Hearing

Appendix B

Location Map

Appendix C

Class I Area Maps

Appendix D

Draft PSD/NSPS/NESHAP Construction Permit No. 1040-0113-CA.1

Appendix E

Statement of Basis

Statement of Basis Addendum